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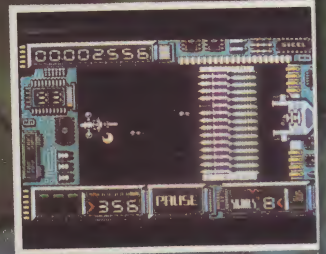
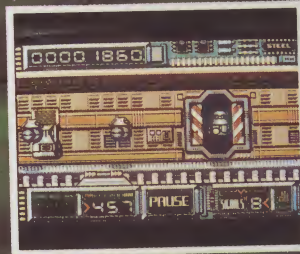
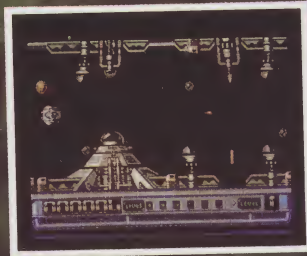
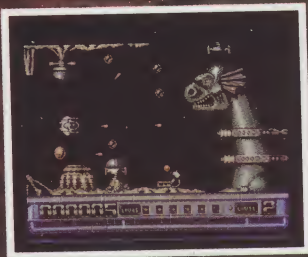


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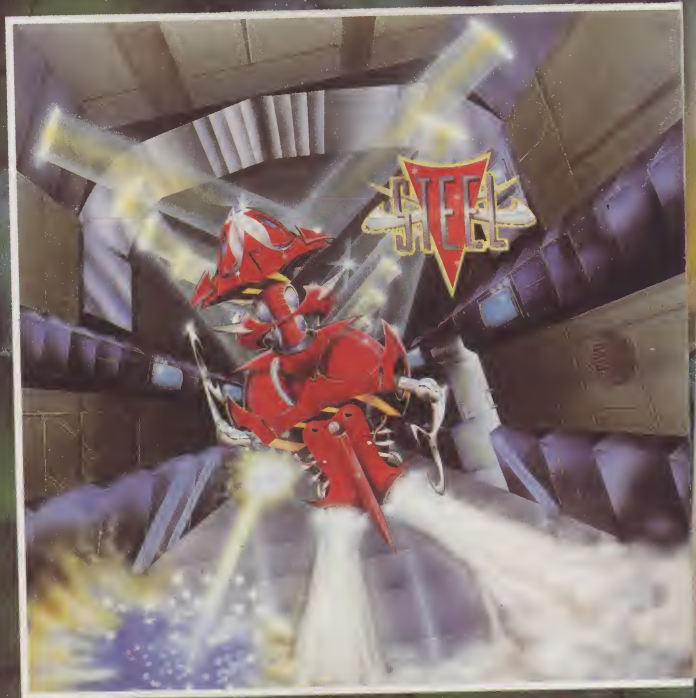
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C O N T



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E N T S

TECHNOST. If it's good for your computer, it's good for you. Boost its ego and find out how far you can push your computing friend to the limits of mankind's world of technological wonder.

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INFORMATION IS POWER. Ignorance is bliss, but if you're to make the best of your equipment, you'd better gem up on what's what in computing. From mags to books, it's all in the writing.

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The Complete Computer Entertainment Guide is a buyers guide aimed at anyone interested in computer entertainment. It provides an introduction to computer leisure activities and advises on the necessary equipment for the various applications.

The Complete Computer Entertainment Guide is a quarterly publication.

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PLAY

How to best partner

Yes, you! Either you've wanted your own computer for a while but can't decide which one suits you best, or you bought a machine sometime back in the Dark Ages and now feel like upgrading to the latest model.

ME? My name is Mel Croucher and it's been my job to predict the future of computer entertainment over the last ten years and try to make those predictions come true, so that the boffins keep their feet on the ground and the tycoons get their hands into your wallets.

Now we know where we stand. But the computers themselves and the entertainment available for them lie buried under waffle, piffle, hype and tripe, technobabble, obscure jargon, claim and counter-claim.

As far as entertainment is concerned, there are a whole load of computers that are about as useful as a chocolate violin, only not as much fun to play with. But even the most inappropriate machines have got some redeeming features, if only for the fact that they were named after fruit. What needs to be understood is that computers are all different, with their own strengths and weaknesses, just like you and me. What they have in common is the ability to run entertainment software, and what you have to do is to establish in your own mind what your priorities are before going for the computer that suits you best within your own budget. More money doesn't necessarily mean more value. I've got a brand new IBM clone that will set you back a thousand quid, is faster than lightning and more powerful than thunder, but it can just about simulate a crummy game of dominoes. I've also got a brand new micro that costs £150 and knocks spots off anything at twice the price for sound, graphics and user-friendliness. Unfortunately I am not allowed to name this machine or recommend it, because I wrote the manual and you



might think I was trying to earn extra royalties, but that's never stopped me before so I'll call it the SAM Coupe. As I see it, the current situation with different types of games machines is as follows:

CONSOLES

These little plug-in-and-go devils started off the whole video game revolution back in the late 70s, and are now enjoying a resurgence. They are ideal for those of you who don't want to create your own stuff, don't care how the machine works and dislike the idea of typing a load of old guff onto a typewriter keyboard. Entertainment is largely restricted to pigmy versions of the sort of thing you find in video arcades, with a high action-reaction factor and a creative value of less than zilch.

8-BIT MACHINES

have dominated the market for years, and old faithfuls like the Spectrum and Commodore 64 still account for an amazing 50% of all sales. There are literally thousands of computer games to choose from, including the so-called 'budget' titles. 8-bit machines are usually cheap and cheerful and allow you to program your own entertain-

MATES

choose your in computing

ments as well as playing shop bought products, and are ideal for the beginner who is a bit strapped for cash and doesn't mind the primitive graphics and pathetic sound qualities of most machines in this category.

16-BIT MACHINES

like the Amiga and Atari ST allow superior graphics and sound at a price. The range of entertainments is increasing daily, and much greater creativity can be achieved for the budding artist and musician with access to a higher budget.

COMPUTER ENTERTAINMENT

has been in the doldrums for about five years, with the same old ideas and themes being rehashed time and time again. The early days of enthusiastic semi-professional outfits offering exciting and innovative games were stifled by the myopia and creative caution of the big companies that now dominate computerised entertainment. But things have started to look up as we head for the 1990s and there is a feeling of excitement in the air once again as the implications of new technology begin to move the ground from under their feet. The ladies and gentlemen that will offer you their ranges of computerised entertainment are highly competitive, and the timing has never been better for you to take that first step along the electronic brick road or to pull out into the fast lane if you've been plodding along it already.

You will be able to pick and choose any fantasy you want to indulge in (and I mean any fantasy), you can link up with enthusiasts all over this world as well as sundry more interesting worlds simply by joining your machine to a computerised network, and as far as perfect sound and vision is concerned the digital future is now!

AMIGA



COMMODORE AMIGA

NOTE The Amiga has established itself worldwide as the best affordable home graphics and video work station providing near professional results.

PRICE The Amiga A500 including one built-in external disk drive, 'free software' and a TV modulator is £399.99. Without software and modulator, they can be found cheaper if you shop around. The Amiga A1000 is only available second-hand. The Amiga A2000 starts at £1,489.25 including mouse. Packages including the A2000, a monitor and a hard disk are also available.

MEMORY A500 model 512K, A1000 model 256K, A2000 model 1Mb. Upgrade RAM cards are available (up to 8Mb).

PROCESSOR 16-bit Motorola 68000, 7.14 MHz. The processor runs slightly slower than the ST's but specialist graphics, video and sound chips help make up the difference through multitasking.

RESOLUTION Several modes from lo-res 320x200 (32 colours on screen) to hi-res 640x400 (16 colours on screen). Some art packages offer an additional Hold And Modify (HAM) mode which allows all 4,096 colours to be displayed on screen.

COLOUR PALETTE 4,096 colours and shades.

SOUND Four-channel, nine-octave range. Stereo output through monitor, TV or hi-fi system. Built-in synthesizer 'speaks' typed-in text.

VIDEO No built-in TV port but a separate modulator is available. RGB output to monitor.

SOFTWARE FORMAT 3.5-inch double-sided disks. Formats to 880K.

PORTS Audio left and right, two joystick/mouse, RS-232 serial, Centronics parallel, RGB, additional disk drive, monochrome video, expansion bus. No built-in MIDI port - a serious problem for musicians.

SOFTWARE The Amiga is rapidly becoming the most popular 16-bit games and enthusiast's machine in the UK and Europe. Good Stateside software support despite dominance of PC and Nintendo systems there. Over 1,000 business and applications programs are available.



ATARI ST

ATARI ST

NOTE A new model, the STE, is to be soon launched, with improved graphics and sound handling capabilities. This will effectively phase out the present 520STFM model. We recommend you wait for the new model at the same price.

PRICE 520 STFM £299.99, 1040 ST £599.99. Both have one built-in external disk drive. Often available with a lot of 'free' software. Also Mega ST2 (£1,034.99 with mono monitor) and Mega ST4 (£1,379.99 with mono monitor).

MEMORY 520 model 512K, 1040 model 1Mb, Mega ST2 2Mb, Mega ST4 4Mb.

PROCESSOR 16-bit Motorola 68000, 8 MHz.

RESOLUTION 640x400 in monochrome display, 640x200 in four-colour display and 320x200 with 16 colours onscreen.

COLOUR PALETTE 512 colours and shades.

SOUND three-channel eight-octave through TV or monitor.

VIDEO RGB. TV port on 520 model, and expected for future 1040 models.

SOFTWARE FORMAT 3.5-inch disks. Earlier 520 models format 360K, while more recent models contain double-sided drives similar to 1040 which formats to 720K.

PORTS 5-pin MIDI in and out. RGB. Serial modem. Two mouse/joystick ports. Cartridge. Second disk drive. Hard disk. TV port (only on 520 model at present).

SOFTWARE Support for the ST has been rapidly growing during 1988. Most new 8-bit releases are now converted to the ST. Though the sound chip is poor compared with the C64 and the Amiga, the ST now dominates music software because of the built-in MIDI ports.

IBM PC/COMPATIBLES

NOTE The original PC was produced by IBM in 1982. But though IBM are still the largest single PC producer, selling about 28% of all PCs, dozens of others produce 'compatibles' which run the same software and are often seen as better value.

PRICE Prices start from £343.85 (Sinclair Professional PC without monitor) and rise... as high as £9,000 (Compaq DeskPro 386). Affordable models include Commodore PC1 (effectively the cheapest £369.99 with mono monitor), Olivetti Prodest PC1 (£399 with mono monitor), and Amstrad PC1512 (£458.85 with mono monitor). PCs are usually sold with monitors.

MEMORY From 256K upwards; at least 512K is recommended.

PROCESSOR PC-compatibles are usually described as 16-bit, but in fact there are 8-bit and 32-bit models as well. Early PCs used the 8-bit Intel 8088 processor; most now use the 16-bit Intel 8086; and the expensive new generation uses the 16-bit Intel 80286 or 32-bit 80386. Speed on cheap machines ranges from 4.77 MHz (eg Commodore PC1) to 8 MHz (eg Amstrad PC1640).

RESOLUTION Originally designed as a business machine, the PC had very basic graphics. But there are now three

major PC colour graphics standards: CGA (Colour Graphics Adapter), at 320x200 (4 colours) or 640x200 (mono); EGA (Enhanced Graphics Adapter) at 640x200 ('200-line mode') or 320x350 ('350-line mode') (both 16 colours); and VGA (Virtual Graphics Array) at 640x480 (2-colour and 16-colour modes). But this is rare and expensive, and doesn't work with standard RGB monitors. Some PC-compatibles have built-in CGA, EGA or VGA - check which - and add-on graphics boards (or 'display adapters') are now available from about £100. For mono displays there is the choice between Hercules, MDA and VGA. If you buy a PC with VGA or EGA and acquire the monitor separately, it's very important to check that the monitor supports the PC's graphics modes! Go for a multi-scan monitor, which will support all display modes right up to Super VGA mode.

COLOUR PALETTE VGA 256, EGA 64, CGA 16 colours and shades.

SOUND One channel, but the speed of the processor allows pseudo-three-channel sound to be produced. Not designed as a music machine. However, sound expansion boards are available such as the Adlib and Sierra boards.

VIDEO No TV port. Output usually via RGB.

SOFTWARE FORMAT Older models

PC

mainly have one or two external drives for 5.25-inch disks, but 3.5-inch disks and drives are taking over. 5.25-inch drives format to 360K or 1.2M, 3.5-inch to 720K or 1.44M.

PORTS Vary from model to model. Most have expansion, RS-232 serial and Centronics parallel ports.

SOFTWARE Huge range of utilities - word processors etc (because of about 25 million PC users worldwide). Also more games than you might expect, largely because of the many PC game-players in America (50% of sales are PCs). So far, poor display and sound have restricted games, graphics or music enthusiasts, but more and more games make now use of the superior VGA display mode. If buying a PC for utilities, check which version of MS-DOS or PC-DOS operating system is supplied - a primitive version older than MS-DOS 3.2 or PC-DOS 2 may cause problems.



ARCHIMEDES

A3000

ACORN ARCHIMEDES

PRICE There are several models now available, the cheapest being the Archimedes A3000 (\$649.95) which includes the keyboard with built in 3.5-inch disk drive and mouse. Prices for the other models range from £801 for the Archimedes 305 to £1,280 for the Archimedes 310M which includes a colour monitor and PC emulator.

MEMORY A3000/305 models 512K, 310 models 1Mb.

PROCESSOR 32-bit Acorn ARM, 4 MHz. RISC (Reduced Instruction Set Computing) technology increases program speed.

RESOLUTION Several resolution modes from 320x256 (up to 256 colours onscreen) to 640x512 (up to 16 colours onscreen but needs a multisync monitor).

COLOUR PALETTE 4,096 colours and shades.

SOUND 16 channels (eight left and

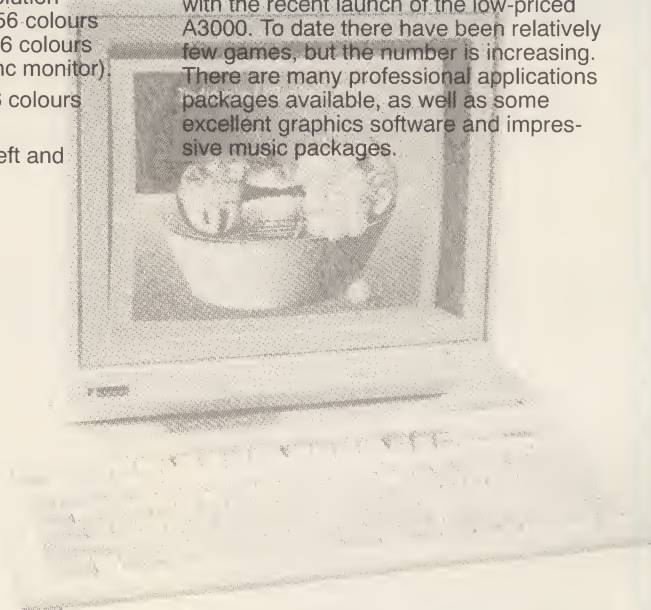
eight right). Six-octave range. One built-in speaker but stereo output is available. Excellent sound chip rivals many low-cost synthesizers.

VIDEO Composite video and RGB outputs. No TV output.

SOFTWARE FORMAT 3.5-inch disks. Disks can be formatted up to 800K.

PORTS 9-pin mouse socket. 3.5mm stereo jack. RS-423 serial. Centronics-compatible parallel. I/O interface for programs requiring input/output. IEC 320 video outlet. 64-way DIN. 41612 expansion port.

SOFTWARE Still yet to take off in a big way. Although we reckon this will explode with the recent launch of the low-priced A3000. To date there have been relatively few games, but the number is increasing. There are many professional applications packages available, as well as some excellent graphics software and impressive music packages.



ACORN BBC

NOTE The BBC has appeared in many models: BBC A, BBC B, BBC B+, BBC Master Series and BBC Master Compact. Only the last two are now available. Listed below are the specifications for the BBC Master Compact. Despite its name, the BBC range has always been produced by Acorn (who now do the Archimedes). But when the British Government decided to put computers in schools, they called on Auntie Beeb to provide a specification for manufacturers to work to - and Acorn got the contract.

PRICE Master 128 £458.85; Master Compact £396.75 on its own, £417.45 with TV modulator, £458.85 with mono monitor, £626.75 with colour monitor.

MEMORY 128K.

PROCESSOR 8-bit 65C12.

RESOLUTION Several modes, ranging from 160x256 (16 colours onscreen) to 640x256 (black and white).

SOUND four-channel six-octave output through internal speaker. However, with an add-on MIDI interface the BBC series has become popular with a number of professional musicians; bands such as Erasure and Bros have been known to use the BBC to act as a MIDI controller.

VIDEO Composite Video, RGB, optional TV modulator available.

SOFTWARE FORMAT Cassette and disk.

PORTS 50-way expansion port, joystick/mouse port, Centronics parallel, PCB Shugart standard disk drive interface.

SOFTWARE There's a vast range of educational software and applications, because until recently the BBC was the most common computer in British schools (it's now being overtaken by PC-compatibles and, occasionally, STs and Amigas). A few games still appear.

BBC

COEG

V1.4

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AMSTRAD CPC

PRICE The CPC464 (built-in tape deck) is £199 with green-screen monitor or £299 with colour monitor. CPC664 models are no longer produced. The CPC6128 (one built-in external disk drive) is £299 with green-screen monitor or £399 with colour monitor.

MEMORY CPC464/CPC664 64K, CPC6128 128K.

PROCESSOR 8-bit Zilog Z80, 4 MHz.

RESOLUTION 160x200 (up to 16 colours on screen), 320x200 (4 colours)

or 640x200 (mono).

COLOUR PALETTE 27 colours and shades.

SOUND three-channel eight-octave through built-in speaker, but stereo output is available. Sound quality is reminiscent of early arcade machines. No MIDI ports.

VIDEO Monitor supplied with all models. RGB sync output.

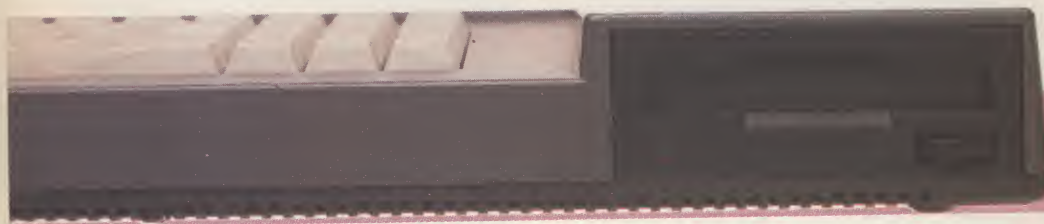
SOFTWARE FORMAT Tape or 3-inch disk. Disk drives format to 180K on each side.

PORTS CPC464 has Centronics paral-

8-BIT

lel, 6-pin DIN RGB with sync luminance, 3.5mm stereo socket, joystick, PCB extension port for disk drive and RS-232 serial interfaces. CPC664/6128 have Centronics parallel, 6-pin DIN RGB with sync luminance, 3.5mm stereo socket, joystick, cassette port, PCB extension port and second disk drive port.

SOFTWARE Most Spectrum and C64 games are converted to the CPC but they tend to run slightly slower. The CPC6128 is capable of running CP/M so a good selection of business packages are available.



AMSTRAD CPC

SINCLAIR ZX SPECTRUM

NOTE The Spectrum, now manufactured by Amstrad, has appeared in many models: 16K, 48K, 48K+, 128K+, +2, +3 and +2A. Only the last three are now available new.

PRICE +2/+2A with built-in tape deck costs £139; +3 with one built-in external disk drive, light gun, joystick and six games £199. Other models available very cheap secondhand.

MEMORY Mostly obvious from names! +2/+2A and +3 have 128K.

PROCESSOR 8-bit Zilog Z80, 4 MHz.

RESOLUTION 256x192 (eight colours onscreen, but only two colours can be used in any given 8x8-pixel block. This often causes 'colour clash' in games that use a lot of colour.)

COLOUR PALETTE 8 colours, can be increased to 16.

SOUND 128K+, +2, +2A and +3 have three-channel output via monitor or TV.

16K/48K/48K+ have one-channel output via built-in speaker. +3 has built-in non-standard MIDI port.

VIDEO All have TV port. 128K+, +2 and +3 also have RGB ports.

SOFTWARE FORMAT Mostly tape. Early models load from ordinary cassette player (extra cost), +2 has built-in tape deck. +3 takes 3-inch disks, though many people prefer to use tape because of disk-loading problems; one built-in reversible single-sided external disk drive can format disks to 180K each side.

PORTS 16K/48K/48K+ expansion port, two 3.5mm jack sockets to connect the Spectrum to a tape recorder and a TV port. 128K+ has expansion port, TV port, Vero phone connector for MIDI/RS-232 serial, two 3.5mm jack sockets, RGB port, Vero phone connector for add-on keypad. +2 has expansion port, TV port, RGB port and Vero phone connectors as 128K+; also two non-standard joystick ports and a 3.5mm socket for outputting sound. +3 is as 128K+ and also has

Centronics parallel printer port and port for second disk drive. Early +3s have two 3.5mm audio in/out jack sockets, later models have one which performs the same function. Also MIDI port on the later models. The recently-released +2A is technically virtually identical to the +3, apart from the fact that it has no disk drive. On the outside, it looks like a +2 except that it's black, rather than grey. However, it has several serious incompatibility problems and will not work with many + add-ons.

SOFTWARE The Spectrum is the biggest-selling home computer in the UK and (at an informed guess) at least 2,000 games are available. Until the growth of 16-bit this year, most of the great classics were Spectrum titles - many still are. A wide range of utilities is also available, but the machine is inadequate for graphics work. Slow/unreliable loading and small memory cause severe problems with any data processing (eg accounting, word processing).



SPECTRUM

8-BIT

COMMODORE C64/C128

PRICE C64 is £129.99 including dedicated Commodore cassette deck and some free software. C128D including disk drive £399.99.

MEMORY C64 64K, C128/C128D 128K.

PROCESSOR C64 8-bit 6510 2 MHz, C128/C128D 8-bit 6502 plus 8-bit Zilog Z80, 4 MHz.

RESOLUTION C64 320x200 (eight colours onscreen, but attribute system limits the number of colours that can be placed adjacent to each other). C128/C128D in 128K mode has a resolution of 640x200.

COLOUR PALETTE 16 colours and shades.

SOUND three-channel eight-octave sound chip which outputs through the monitor/TV. The 6581 SID chip (Sound Interface Device) is one of the most sophisticated sound chips on a 8-bit computer.

VIDEO TV ports on all models. C64 has a composite video port, C128/C128D

both have RGB ports for an 80-column display.

SOFTWARE FORMAT Tape or 5.25-inch disk (C128D only). Commodore also manufacture two external 5.25-inch drives - the C1541 (formats to 140K) and the C1571 (formats to 340K). Blank disks very cheap, but easily damaged.

PORTS RGB (C128/C128D), composite video (C64), two joystick ports, cassette, TV, expansion port, serial (non-standard), user port.

SOFTWARE The Commodore 64 is an old computer with years' worth of games and utilities, many imported from America. Many users, so new software likely to flow for some years yet. Z80 chip on C128/C128D allows it to run software written for CP/M operating systems.

C64

MSX-II

MSX-II

NOTE MSX and its successors, MSX-II and MSX-II+, are not brand names of actual machines - MSX is a compatibility standard, or a set of rules for designing computers, developed by Japanese inventor Kay Nishi in the early Eighties. The situation is a bit like that of PC-compatibles: many manufacturers have produced MSX machines, but basically the same software runs on them all. The most famous MSX manufacturers are Sony.

PRICE Prices start from about £340 and rise according to model. The MSX-II+ is still not officially available in Britain.

MEMORY Models range from 64K to

256K.

PROCESSOR 8-bit Zilog Z80A, 3.57 MHz.

RESOLUTION Various modes: 512x212, 256x212, 512x424 (interlace).

COLOUR PALETTE 256 colours and shades. The MSX-II+ has 19,268 colours!

SOUND three-channel eight-octave sound chip which outputs through monitor/TV.

VIDEO TV port and SCART plug for RGB monitors.

SOFTWARE FORMAT Tape, ROM cartridge or 3.5-inch disk.

PORTS Varies according to model but most include TV, Centronics parallel, two



joystick ports, MSX expansion port, DIN plug to connect to cassette recorder, and cartridge port.

SOFTWARE Plenty of games and applications are available, but don't expect to find much in the high street. The most well-known MSX supporters in Britain are Konami, who run a users' software club - (0626) 56789. MSX software is upwardly compatible - that is, software written for the MSX will run on the MSX-II and the MSX-II+ (but not vice-versa!). The MSX machines have the same BASIC programming language (called MSX BASIC) and the same Microsoft operating system (MSX-DOS).

8-BIT

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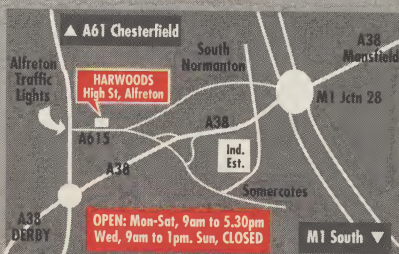


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SEGA MASTER

SEGA MASTER SYSTEM

PRICE Games console including light gun, game controller and one game retails at £79.95.

RESOLUTION 256x192 (up to 64 colours onscreen).

COLOUR PALETTE 64 colours and shades.

SOUND Three-channel sound played through TV.

VIDEO TV only. The Sega cannot be used with a monitor.

SOFTWARE FORMAT Special unerasable Sega cartridge - no tapes or disks.

PORTS Cartridge slot, two game controller ports (for two-player games) and TV port.

SOFTWARE Games only, mainly conversions of Sega coin-op games.

After a lukewarm start, the Sega was selling like hot cakes in early 1989 and we predict good software support, with games often entering the Gallup software chart.

C O N S O

NINTENDO ENTERTAINMENT SYSTEM

PRICE The standard version includes console, game controller (used instead of keyboard/joystick) and one game at £99.95. The Deluxe version includes game controller, light gun, ROB (Robotic Operated Buddy) robot and two games at £149.95.

MEMORY Not known, but software cartridges are mostly 256K.

PROCESSOR 8-bit.

RESOLUTION 256x240 (up to 52 colours onscreen).

COLOUR PALETTE 52 colours and shades.

SOUND Three-channel sound including speech synthesis played through a TV.

VIDEO TV only. The Nintendo cannot be used with a monitor.

SOFTWARE FORMAT Special unerasable Nintendo cartridge. Despite some efforts by independent firms, no disk or tape software is available for the Nintendo. The Japanese-owned manufacturer once developed a disk drive but abandoned it because of piracy problems.

PORTS Game controller, TV, cartridge.

SOFTWARE Games only, £20-£25 each. So far little software has been released in the UK, though hundreds are available in Japan and US Nintendo now promise at least two new games per month in the UK.

CCEG

NINTENDO

CONSOLES



PC ENGINE

PRICE As yet there is no official UK distributor, so prices vary from importer to importer. PC Engines can be picked up for as little as £160 on mail order basis.

MEMORY One meg on-board RAM and one meg video RAM.

PROCESSOR 8 bit custom chip, with 16-bit graphics chip.

RESOLUTION 256x216, up to 64 sprites onscreen at once.

COLOUR PALETTE 512 colours and shades.

SOUND Six-channel, eight-octave through TV or monitor. Stereo sound via hi-fi or suitable monitor.

VIDEO TV or monitor (via supplied interface).

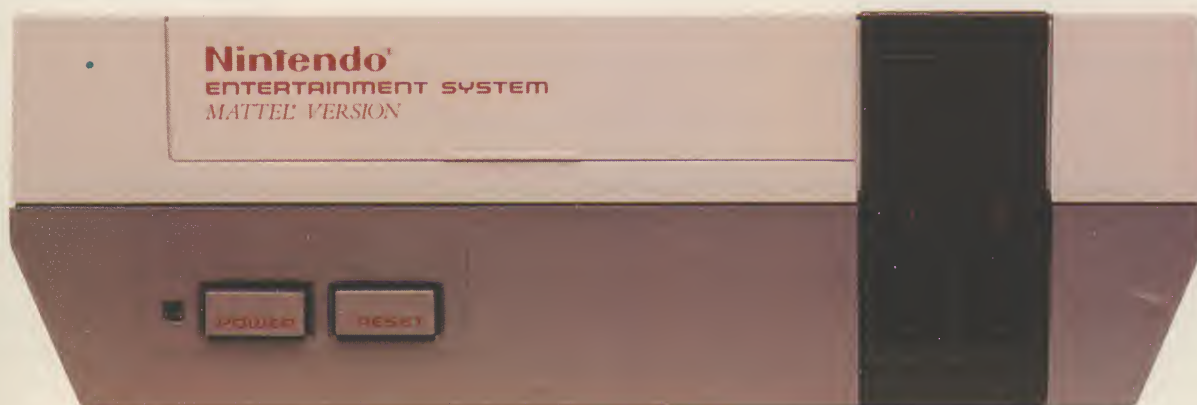
SOFTWARE FORMAT Special unerasable PC Engine two-meg ROM cards - no tapes or disks. CD-ROM games (loaded from disks like music CDs) are now available at same price.

PORTS Cartridge slot, one joystick/pad port (although five can be connected through Multitap connector), large expansion port (for forthcoming printer).

SOFTWARE We estimate that approximately 60 games are available, but this number is rapidly increasing each month.



PC ENGINE



CONSOLES

CCEG



GAMES NOW

PING PONG

Most computer entertainments invite you to use your eyes to spot an action, and then to react to what you see by using your hands in a reaction. Driving a racing car/space ship/golf ball around an electronic circuit, controlling a pinball machine/BMX bike/homicidal maniac in an environmental fantasy: it's all ping-pong disguised brilliantly and imaginatively.

CHESS

Anything that doesn't involve the instinctive eyeball-fingertip relationship and does involve mental processes of reason and deduction falls into my other category. Adventure games, music, art and 'Trivial Pursuit'. The wonder of the computer illusion is that these two basic categories can be transformed into hybrid entertainments that are not only stimulating, but also addictive in their simulations of pleasure. I bid you a warm welcome to a world that exists only as fleeting pulses of electrical energy, but that can conjure dreams, nightmares and alternative realities, and leave you with a list of personal headings of computer entertainment, available now for a few quid of your common money and a few hours of your precious time.

FANTASY AND ADVENTURE

wherein you stumble through alien landscapes trying to perform set tasks. You will meet some very interesting characters on your travels and after communicating with them they will probably try to murder you.

SPORTS SIMULATIONS

play Steve Davis at snooker, fight Frank Bruno in the ring, race at Le Mans, score 180 at darts, make a home run, annoy old ladies in Tesco's with your skateboard, you name it and there's a simula-

The Editor of this publication has asked me to provide a simple introduction to the range of entertainments on offer, and I can't get any simpler than the following sentence. There are only two computer games in the world, and everything else is a derivative or expansion or adaptation of these two games. The first computer game is 'ping pong' the last is 'chess', everything between is a mixture of the two.

tion waiting to be played, often at a budget price.

FLIGHT SIMULATORS

almost as sophisticated as the real thing these days, and still a favourite with would-be bedroom pilots. The main advantage being that when you land your jumbo jet halfway up the Empire State building nobody gets hurt.

BOARD GAME SIMULATIONS

If you can't find a human opponent, your computer will give you a good run for your money in an automatic version of traditional board games such as Scrabble, Monopoly, Trivial Pursuit, and not forgetting the computer game that is still the largest selling of all time: chess.

MANAGEMENT GAMES

these usually involve double dealing and greed as you attempt to amass vast fortunes in the world of corporate finance, rock music and the like, although the sporting management games do involve a modicum of skill and judgment.

DEATH AND DESTRUCTION

bomb, hack, slash, stab, kick, garrotte and shoot anything that moves. Um, that's it.

STRATEGY WAR GAMES

plan your campaigns and command vast armies at Waterloo or Alpha Centauri, and then bomb, hack, slash etc. etc.

SEXIST SMUT

digitised nudies playing strip poker and the like. Ho hum.

CONSTRUCTION KITS

are the easy way to create your own entertainments, and work just like electronic blocks of Lego that you select and assemble to suit your needs and whims. You can choose anything from pinball machine, a golf course, a cartoon animation to a full-blown text and graphics opera

DATA SPACE

similar to fantasy and adventure games with one important difference... you exist in alternative realities alongside real people by linking up your machine to a network of other players via telephone lines. But beware, living in data space can run up one hell of a phone bill!

CELEBRITY ENDORSEMENTS & SPIN-OFFS

often an excuse for selling a load of old tosh under the guise of 'you've seen the film, read the book, watched them on TV, now suffer all over again'. Anything that moves seems to be up for grabs, and some of the computerised versions of cartoons, films, books and TV personalities are not wholly bad. James Bond, Garfield, RoboCop, Rambo, Tom and Jerry, Batman and even some characters such as Jeffrey Archer, Kenny Dalglish and Bob Monkhouse. Welcome to the worlds of computer gaming folks.



VETTE! SPECTRUM HOLOBYTE/MIRRORSOFT

Burn rubber through the streets of San Francisco without worrying about criminals. After all you're in one of the ultimate American car - a Corvette (one of four types). You're up against the clock, you're up against another driver in an Italian car and you've got the cops on your tail. What are you going to do? 'Put the accelerator to the floor' is the answer in this full-blown muscle car simulator. Without a 386 PC with VGA graphics card Vette! does take a beating but even so who could resist roaring down the freeway, dodging Sunday Drivers, burning up trucks and weaving through downtown 'Frisco at 155 Mph. Flight simulator style car graphics and buildings give it that much needed detail with more keys than F-19. Watch out for the helicopter view to really make for some high speed action.



U.M.S. RAINBIRD

U.M.S. (the Universal Military Simulator) brings wargames bang up to date with a new 3-D realism added to the harsh reality of war. You can't fail to be impressed by the 3-D map of the battlefield. Rotate the whole map, zoom down to grass level, raise and lower the viewpoint or why not construct your own map based on fact or fiction — the choice is yours. It's not just the map either that makes U.M.S. so great. Imagine being able to pit armies from different times against one another. Envisage creating 'what if' scenarios and see what would have happened if Napoleon had a thousand more cannons or if tanks had been in action at The Battle of Hastings! Imagination literally runs riot. With this level of complexity U.M.S. gives all other ground conflict wargames a sharp kick up the behind and deservedly so.

OUT RUN US GOLD

How a PC can compete with Megabytes of dedicated arcade machine is a question which seems unanswerable. But Out Run shows us how to do it. So what if the sound is pretty dire; the thrills and spills are all there with the turbo Ferrari rocketing through California. Smaller graphics than normal are compensated for by very good use of EGA and an excellent looking illusion of movement with cars rushing past (even more so on a 386 machine). Pure action racing games aren't all that common on the PC but Out Run is there and it is very good indeed.

CAVEMAN UGH-LYPMICS ELECTRONIC ARTS

We can't have simulations dominating the chart can we? If there was one game which really puts you to the test when it comes to joystick waggling AND keeps you entertained then this is it. In the millennia before the Olympics the Cavemen had their own 'sports' with such classic events as Fire Making, Dino Vault and Dino Race, Saber Race and the ultimate in subtlety - the Mate Toss - all good, clean intellectual stuff with a wicked sense of humour that really makes the game. In EGA mode Caveman is a beautiful sight to see and is the only way to be played.

FERRARI FORMULA ONE ELECTRONIC ARTS

It's a toss-up between this and Vette! but if you want serious car racing with all the problems of Formula One races, pit problems, engine tuning, the international circuit and all then this is THE ONE. Starting from Ferrari's HQ at Fiorano, you're in the international league and up against the best of the best. Start off by testing out the car's aerodynamics, test the engine to destruction to achieve those perfect parameters and put the car into a wind tunnel for the sleekest car on the track. When you've done all this you've still got the international competition to win in circuits around the world. The better graphics modes are an obvious boon to the game but as a dedicated racing simulation in its own right Ferrari Formula one wipes the floor with all others. A novel viewpoint system comes into play during the races as you swing the car into the bends, cutting up the rival's cars and hoping that that engine doesn't give up on you. Even in the pits things don't get any easier with a degree in car engineering required just to get a new engine installed. This is one totally demanding, totally realistic and totally awesome racing simulation.

F-19 STEALTH FIGHTER MICROPROSE

A totally revamped and graphically superlative conversion of the C64 hit, F-19 comes the closest yet to recreating those Rediffusion £20 million simulators. Gung ho all American action is what it's all about as the US Air Force's most secret toy is sent into four battlezones around the world. Fly over the North Cape, the Middle East, Libya and Central Europe. Encounter many interesting aircraft, vehicles and ground installations and take them out with a vengeance. Leaving all other simulations standing, F-19 takes simulation realism to new heights with a new generation of polygon graphic techniques. Ships ARE ships, there are cranes in the docks, submarines berthed in the harbours, MiGs and 747s take off from runways, missiles rocket away from SAM sites, targets belch smoke when hit - the list is endless in this landmark in simulation history.

POOL OF RADIANCE S.S.I./US GOLD

US Gold's contribution to the RPG cause but this one has the big boys' backing: TSR and Advanced Dungeons and Dragons, no less. Much in the same style as Bard's Tale III, Pool is for the more traditional AD&D enthusiast looking to recreate not only the hack and slaying of many a Kobold but the puzzles and vast flexibility of the massive subject. The PC has a go and succeeds admirably with a strong adventure side to the game, combined with a gripping tactical 3-D battle sequence. Graphically it's probably the most attractive PC RPG to date (making Bard's Tale III look simple when in VGA mode). A massive world crammed into one RPG with more to come — thus ensuring a long life.

THE BARD'S TALE III ELECTRONIC ARTS

The final part of the legendary Bard's Tale series sees Interplay create what must be the ultimate RPG so far. With 84 dungeons and seven Time Dimensions to adventure through and over 500 creatures to battle against Bard's Tale III is Interplay's finest hour. Following the defeat of Mangar in part one of the series, celebrations were in order in the city of Skara Brae but the Mad God Tarjan thinks otherwise and destroys the city. Now it's the veteran band of warriors, magic-users and thieves against the might of Tarjan - enough to make the Bard stop drinking you might think, and you'd be right. Classic RPG involvement with superb graphics, immensely difficult puzzles incredible depth to it to keep novices and veterans alike burning the midnight oil for quite some time to come.





AMIGA

XENON 2 — MEGABLAST Imageworks

The Xenites have placed five time bombs throughout history and you have been sent to defuse them. Many creatures attack through the vertically scrolling levels but when destroyed leave money which can be used to buy many types of weaponry.

Xenon 2 has arcade-quality graphics: colour and detail are packed into the imaginative sprites and scenery and attack waves are fierce and elaborate. With a

healthy complement of weaponry, the amount of firepower blasting around the screen is awesome, and the sampled remixed Bomb The Bass soundtrack is perfect backing. A shoot-'em-up par excellence — a true megablast.



ZANY GOLF Electronic Arts

Remember holidays when you were younger, playing crazy golf with your relatives on a seaside pier? Zany Golf has nine holes inspired by such antics but of a considerably grander, not to say sillier design. Giant bouncing hamburgers, electric fans, hole-shifting ants, force fields and teleports are just some of the outrageous features of a round.

The humour and imaginativeness of the holes, competently drawn and animated, instantly appeal and are backed up by a good, easily learnt control system. Its simplicity is one of the reasons why Zany Golf is such tremendous fun; particularly between friends, it's addictive putting all the way.

SHADOW OF THE BEAST Psygnosis

A man-goat has discovered his true life, as a human before the Beast-Mage's transformed him into their servant. Human sacrifices have driven him into a rage and now he uses his supernatural strength to punch the life out of all that praise the all-seeing Beast. Travelling under and overground, items and weapons are necessary for progress and, ultimately, a showdown with the Beast.

Shadow Of The Beast's graphics are gorgeous — in outdoor scenes, smooth 13-layer parallax and careful detail form a beautiful background over which monsters of fantastic design run. Over 100 creatures, some a third the size of the screen, inhabit the 350 screens of hectic arcade adventure, with more beat-/blast-'em-up action than ever before. Technically brilliant, brilliantly playable.



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KICK OFF

Anco

Although thus far relatively few football games have appeared on the 16-bits, Kick Off looks to be an unbeatable product. Showing a plan view of the pitch and players, it's most radical difference from the norm is that the ball doesn't stick to the player's foot when in his possession. Kick Off's other quirk is a transparent 'radar' which tracks the position of the ball and players.

Kick Off demands more skill from the (human) player than any other soccer game: considerable practice is necessary to seriously compete at any level, let alone consider yourself a good player. This difficulty is by no means bad, as a clean series of passes, dextrous dribble or, most obviously, dazzling goal gives a fantastic feeling of satisfaction. Games between friends are tremendous fun, generating friendly but fierce competitive spirit unsurpassed in any two-player game.



DRAGON'S LAIR

Entertainment
International/ReadySoft

Heroic Dirk has to reach the darkest depths of a foul dragon's castle to save his true love, but the chambers are filled with many dangers. Various creatures are unhappy to see him and devious traps abound; joystick moves influence his actions in this interactive cartoon.

The 8-bit conversions of this coin-op were something of a joke but happily the Amiga interpretation is a completely different story. As in the original, gameplay is simple and limited, but the graphics are remarkably close to the original and the soundtrack is completely sampled. Unfortunately only for megabyte Amigas, Dragon's Lair is one of the most aesthetically spectacular games yet.



SUPER HANG-ON

Electric Dreams

No hydraulics in this conversion of the Sega coin-op but plenty of fast motorcyclist. After selecting the race track (and so the skill level) it's full throttle to 280km/h. It's then that the nitro injector may be kicked in to accelerate to 324km/h, although this makes navigating the bend and dips more difficult.

Perspective and vertical movement of the road are cleverly done and it's this that makes Amiga Super Hang-On so effective and fun to play. At high speeds it's not uncommon to find yourself swaying from side to side to coax the bike around a bend, so good is the illusion of movement. Edge-of-the-seat action rivalled but never beaten by other computer racing games.



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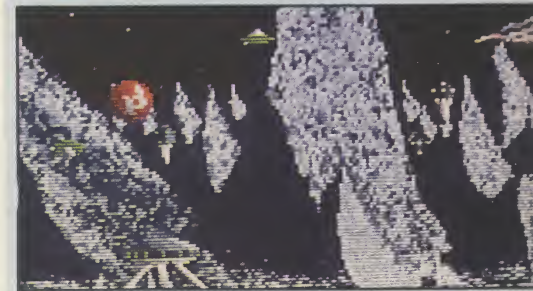
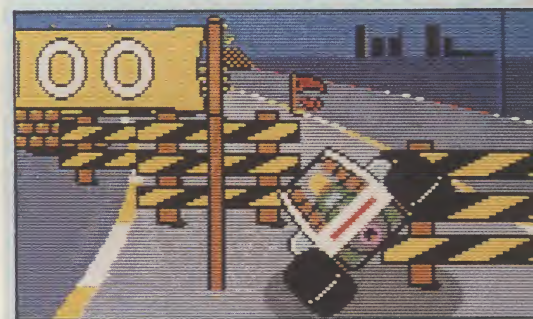
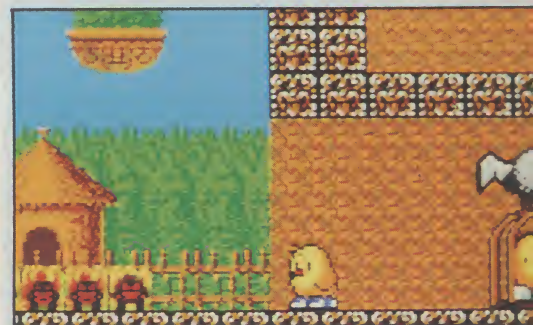
PAC-MANIA Grandslam

In the latest game featuring Pac-Man our round yellow hero is once again trapped in a maze, gobbling up pills and pursued constantly by a motley group of ghosts. This time, however, the maze is shown in isometric 3-D and yet another dimension is added by the fit Pac-Man's new-found ability to jump high in the air. As well as evasion tactics, Pac can, of course, eat power pills, allowing him to bite back.

Pac-Mania is, in real terms, a very similar game to the ancient original Pac-Man coin-op. Pac-Man-style games always fitted the adage 'the simplest games are the best'. Updated with 3-D and jumping ability, a thoroughly addictive game is formed, with graphics and sound very close to the coin-op. A highly accurate conversion of one of the most playable arcade games of recent years.

spectacular — the stills are pleasant and detailed but not dazzling — but their subtlety neatly complements the text. The parser isn't particularly intelligent but it's the story and puzzles that make an adventure and Shogun excels in those areas. Although the puzzles are devious and plentiful they exclude the annoying illogical indulgencies of certain programs, so Shogun will have you scratching your head rather than tearing out the hair upon it. Play the game and experience 17th century Japan.

ALSO HIGHLY RECOMMENDING FOR THE AMIGA



R-TYPE Electric Dreams **NEW ZEALAND STORY** Ocean **CARRIER COMMAND** Rainbird **POPULOUS** Electronic Arts **MILLENNIUM 2.2** Electric Dreams **SILKWORM** The Sales Curve/Virgin **BUGGY BOY Elite** **BATTLE CHESS** Electronic Arts **KULT** Exxos **POWERDROME** Electronic Arts **STARGLIDER 2** Rainbird **IK PLUS** System 3 **FOFT** Gremlin **CYBERNOID II** Hewson **BLOOD MONEY** Psygnosis **STARRAY** Logotron

WICKED Electric Dreams

The Devil himself is attempting to take over the 12 constellations of the Zodiac, his magic portals spreading evil growth. The symbol of the Sun God is steered and used to stunt the growth and allow good to spread, but both sides release spores which develop new portals. Good benefits or suffers from the collection of icons.

Wicked is certainly a shoot-'em-up but not in any normal sense. Quality presentation is mystical and gothic, leading to single-screen levels unique in both look and gameplay. The struggle between good and evil is remarkably exciting and really gets the adrenalin going when Lucifer has the advantage — but a star is never lost until the last portal is overwhelmed.



FALCON Mirrorsoft

The favourite aircraft for computer games, the F-16, has 12 ground strike missions to tackle here, against runways, bridges, communication centres and SAM sites. A selection of weapons are added to the jet's payload to wipe out the targets and the MiG-21's that try to stop it.

Falcon's F-16 has a realistic performance and flight controls, yet even with its accuracy and ground features, graphic design is clear and movement smooth and fast. This arcade speed means that Falcon is easy to get into and appeals to those usually wary of flight simulations. There's enough depth and challenge to keep you playing long after the initial unfamiliar buzz of fast flight combat: Falcon is much more than a first-person shoot-'em-up.

SHOGUN Infocom

One of Infocom's first adventures including graphics, Shogun is an adaptation of James Clavell's novel, you determine the fortune of John Blackthorne. A merchant ship pilot cast ashore during a storm, he has to adapt to a new country and culture, ultimately to become a shogun.

Infocom's entry into graphics isn't



ST

NEW ZEALAND STORY Ocean

Wally Walrus has caught 20 of your friends to make a tasty snack. Being the brave Kiwi you are you set off to rescue them, running and jumping through the maze-like levels. Initially armed with a bow and arrow, you can collect everything from a laser pistol to a balloon to battle villains ranging from toy soldiers to Ray Ban wearing Teddies. There's 20 varied levels, divided into sections of four. Complete a section and when you die you only go back to the start of the new section, rather than the start of the game. First class arcade action.

STARGILDER 2 Rainbird

After being defeated in the original game, Hermann Krud has launched a hideous revenge plan. The nearby Solice System has been invaded by his mighty space armada and construction begun on an enormous weapon. The old Starglider crew is reassembled to take on Krud in a small space fighter. This time they must locate a genius scientist, and certain equipment scattered over the System's five planets and ten moons.

This tough mission is one of the most spectacular 3D games around. Apart from

space pirates, projector bases and bouncing bombs there's some completely wonderful, if irrelevant, things such as the brilliantly animated space whales of Millway. Quite simply a classic.

MILLENNIUM 2.2

A giant meteor has wiped out all life on Earth, leaving the fate of Mankind in the hands of two bases; one on the Moon, one on Mars. You're Moon Base commander and must set about colonizing the Solar System, not neglecting your military defences. Apart from a simplistic 3D arcade section, this is really an adventure with all your commands carried out by windows and icons. Your responsibilities are represented by seven domes, the most important of which are Research, Production, Defence and the Hanger dome (where any ships you might build are controlled from). With frequent saves this is perhaps a touch easy, but the atmosphere of the game is superb making for extremely high addiction. Expect a few very late nights with this one.

F-16 COMBAT PILOT Digital Integration

The F-16 is a small, fast, lightweight fighter that's proving very popular with flight sim producers. While Falcon is graphically superior, and easier to begin with, F-16 offers better value with five training missions and a war option where you command a squadron of F-16's at war - you have to spend £20 for a mission disk to have this on Falcon. The war option provides an exceptionally tough challenge which will take a lot of sorties to complete, especially with three different types of MiG fighters and lots of missiles to dodge. Undoubtedly the power of 16-bit machines have allowed a massive leap in the realism of flight sims, and F-16 is a first class example.

CARRIER COMMAND Rainbird

The aircraft carrier Omega has been infected with a virus, turning it into a war-mongering menace using its Walrus amphibious tanks to turn neutral islands into factories producing materials and vehicles for its war effort. You're in command of a second carrier sent to destroy the Omega. But with an island chain as vast as this one, you'll run out of fuel before you find it unless you develop your own support network. You can also invade heavily defended enemy islands and convert them to your own purposes. The real star of show though, is the carrier itself which is undoubtedly the most complex vehicle yet to be programmed. Besides the amphibious tanks and aircraft, there's an excellent map feature, repair robots, laser turret, surface-to-surface missiles and lots more besides. A great blend of tactics and arcade action, in short.



RAINBOW ISLANDS Firebird

Once imprisoned in dinosaur form (in the superb Bubble Bobble), Bub and Bob are back in sickeningly cute human form, but still being chased by Baron Von Blubba and all his henchmen. On each of the Rainbow Island levels Bub and Bob start at the bottom of the vertically-scrolling play area. At the top is a hostage you must rescue by bouncing to the top using spectacular rainbows which you throw out to climb on top of. The rainbows can also be used to imprison baddies. If you want superbly presented arcade fun, with a simultaneous two-player option, this is well nigh irresistible.

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DUNGEON MASTER

FTL/Mirrosoft



This is one of those games people buy STs to play. A superbly atmospheric RPG adventure it pits a team of four against the many hideous monsters and traps of a dungeon divided into a large number of different levels. The screen is divided into three windows; information on your characters, menus for controlling the game and a large area showing a 3D, first person perspective of the dungeon. Besides using 'hand' icons to pick things up and use items such as weapons, there's also lots of spells to learn and use. On top of a brilliant design, there's excellent attention to detail with torches gradually burning out and characters slowly learning new skills. Quite simply one of the best computer games ever.

POPULOUS

Electronic Arts

This won pretty much every award going when it appeared, and has recently had a 'scenery disk' released offering a variety of new landscapes and peoples such as cowboys and indians, French revolutionaries and computer bugs. The original game pits two groups of people against each other. One group worships a good god (usually yourself), the other the evil god (usually the computer). The groups start off with relatively low numbers, but soon multiply if you provide them with flat land. Raising or lowering ground is one of your divine powers, limited by the amount of energy provided by the number of your followers. Other powers include creating marshland, causing floods, turning someone into a knight (to burn down enemy houses) and much more besides. Merely watching your tiny followers wandering about the four different types of landscapes (from desert to arctic wastes) is fun, but actually playing is brilliant. And what's more there's 500 levels to fight through, plus a customize map feature.



TYPHOON THOMPSON

Broderbund/Domark

It's 2124 and there's been a crash on an alien world. You've been assigned the duty of rescuing a child adopted by the sea world's main inhabitants; cute, but heavily armed sea sprites. These live in villages made up of a group of islands. To persuade them to give you vital equipment you must shoot the ships they chase you in, then scoop the sprites out of the water before they swim back to their islands. Their ships vary from those that simply push you round to Bubblers which throw bubbles to suffocate you. The game's graphics are small, but superbly animated and very fast. Gameplay is incredibly addictive, simple but very playable.

KULT

Exxos

Probably the world's weirdest software house came up with a real classic with this bizarre game. The scenario is extremely complex, but basically you're wandering about The Temple Of The Flying Saucers trying to solve Five Ordeals. These puzzles are made up of a couple of rooms each, and can be attempted in any order. Besides using a cursor to examine the rooms, and clicking on objects to get an option menu in the shape of a brain, you can use psi powers such as reading someone's mind, seeing in the dark and tuning into a Tuner network for clues. Merely completing the Five Ordeals won't be enough though, the Temple's priests are a treacherous lot and your brain-washed girlfriend is among them. This is a beautifully presented, tricky but logical adventure that deserves investigation by anyone who wants more than a mindless shoot-'em-up.

ALSO RECOMMENDED:

STRIDER (US Gold £19.99)
SUPER HANG-ON (Electric Dreams £24.99)
KICK-OFF (Anco £19.95)
PURPLE SATURN DAY (£24.95 Exxos),
FALCON (£24.99 Mirrorsoft)
XENON II (£24.95 Image Works)
LEGEND OF THE SWORD (Rainbird £24.95).





COMMODORE 64

**THE OFFICIAL CCEG 64
GAME ROUNDBUPS BY
PAUL RAND!**

**C64— THE TEN ALL
TIME GREATS
ARCADE**

URIDIUM Hewson

The all-time classic from 8-bit legend - turned Amiga specialist *Andrew Braybrook*. A horizontally-scrolling arcade shoot-em-up, *Uridium* was the first, and arguably most successful, attempt at the use of bas-relief graphics; an experiment which paid off with spectacular results. The atmospheric presentation of *Uridium* is complemented by the sort of exhilarating gameplay reminiscent of coin-op machines. Originally released at £9.99, *Uridium* is now available on Hewson's *Rack-It* label at a very reasonable £2.99 - a luxury which all C64 owners can afford.

And then there's...

Wizball Ocean

A highly original concept joins forces with the somewhat hackneyed horizontally scrolling shoot-em-up game style to present a new twist to the arcade tale. Become a wizard from another planet as you and your cat (!) take on the enemy in a desperate battle to return the colour to your homeland.

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DRIVING

BUGGY BOY Elite

Without a doubt the most impressive of the C64's clutch of racing games. Not so much a simulation, more an exercise in adrenalin pumping (the game is, after all, a conversion from the ageing-yet-addictive coin-op), the objective of *Buggy Boy* is simple - make your way around one of five off-road courses, picking up bonus-giving flags and avoiding hazards such as walls, trees and rivers along the way. *Buggy Boy*'s success lies in the fact that the original arcade machine wasn't an impossible conversion project, a problem which the programmers of the likes of *Out Run* and *Wec Le Mans* failed to notice.

And then there's...

Test Drive II-The Duel Accolade

Improved dramatically on its prequel, *Test Drive*, by adding computer-controlled opposition in the form of either a Porsche 959 or Ferrari F40. And of course, the traffic cop hung on in there to make reckless driving that bit more of a problem.

Grand Prix Circuit Accolade

Hampered by an awful multi-load on the cassette version, *Accolade's* interpretation of Formula One racing remains one of the most impressive games of its type on the 64, offering high-speed arcade racing action where others have failed.

SIMULATION

GUNSHIP Microprose

Whereas most flight simulations tend to show bias toward aircraft of the winged variety, sim specialists *Microprose* took a brave decision by releasing a game based on the US Army's AH-64A helicopter gunship. A decision which paid off with spectacular results (current sales figures for *Gunship* hover around the 300,000

mark). *Gunship's* advantage over both past and present flight sims, other than the fact that (apart from the mediocre *Tomahawk* - also an Apache sim) helicopter sims were untested ground, was its use of solid-filled wire-frame 3D terrain, whilst retaining the fast pace necessary to give the impression of speed and overall realism.

And then there's...

Project Stealth Fighter Microprose

The latest sim to bolt from the Microprose stable also offers speed, graphics and general playability far surpassing any other 64 combat plane sim on the market today.

Chuck Yeager's Advanced Flight Trainer Electronic Arts

No combat, just a brilliantly designed and presented simulation of the life of a test pilot. Around a dozen different planes, from the Sopwith Camel to craft not yet in service, solid-filled graphics and outside-the-cockpit views make *CYAFT* the one for pacifists to go for.

BOARD GAMES

TRIVIAL PURSUIT Domark

Digital incarnations of mainstream boardgames are, on the whole, pale imitations of the original. *Trivial Pursuit*, on the other hand, saw a novel approach to the genre which paid off. Making as much use of the C64's graphic and sonic abilities as possible, the game (and its pixellated host, *TeePee*) pulled the player into an extravaganza of sights and sounds. Answer selection was also tackled in a way never before utilised - instead of a list of possibilities, the player would simply shout out his choice, inputting whether he was right or wrong when the actual answer was displayed. This allowed, for the first time, utilisation of the most enjoyable facet of any board game - the ability to cheat.

And then there's...



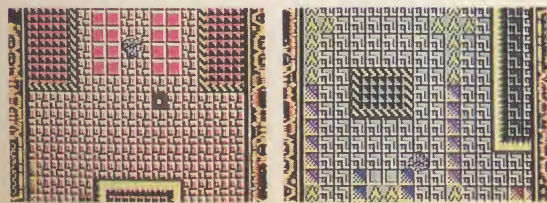
THALAMUS



A DEAD MAN'S
KILLING JOKE...



By Rob Stevens



The Snare: a twenty-level deadly maze built in a temporal cavity by billionaire Andre Thelman who ten years ago entered his creation with his most valued possession — and died.

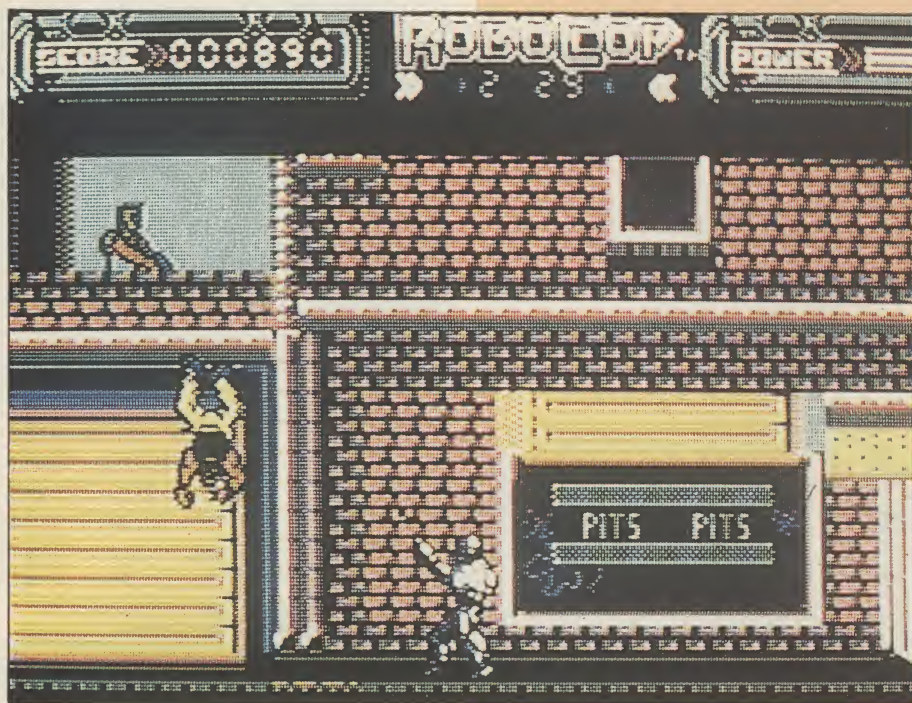
The hunt for the mystery treasure has turned into the hottest vid game show on earth as contender after contender dies trying to crack the maze's secrets. Will you succeed?

Snare: fiendish, frustrating and deadly — only for the quick-witted!

CBM 64/128

Cass: £9.99

Disk: £12.99



Monopoly Leisure Genius

The most accurate version of the hugely popular traditional boardgame and easily the best title from the Leisure Genius range, C64 **Monopoly** allows the whole family to enjoy the thrills and spills of property-owning without having all of the bits lying around the floor!

Robocop Ocean

So impressive that the computer game spawned a Data East coin-op, **Robocop** is highly in-keeping with the mood of the film, and also manages to be one of the best multi-event games ever.

Way Of The Exploding Fist

The game that started the karate bandwagon rolling. One on one all-out smack-his-face-in brutality, **WOTEF** earned itself the praise it deserved all those years ago and, on release now at £1.99, thousands of newcomers are given the chance to experience a legend.

STRATEGY/RPG

BARD'S TALE Electronic Arts

The somewhat specialist area of role-playing had been attempted previously, with comparatively little success in terms of programming and general user interest, but **The Bard's Tale** gave even hardened C64 arcaders the opportunity to delve into the world of computer RPG. Set in the mythical city of Skara Brae, the player takes control of six fantasy characters, each with their own strengths and weaknesses. The ultimate aim is to increase the experience of each character, which in turn opens up new doors such as spell-casting and the like. Skara Brae is not the most friendly of environs, however, so combat plays a large part in the proceedings. **The Bard's Tale**, with its wealth of different characters, puzzles and battles, made computer RPG a marketable prospect, being accessible to both beginners and experts alike - even more so now, at its new price of £2.99.

And then there's...

Rocket Ranger Mirrorsoft/Cinemaware

At last, you'll believe a man can REALLY fly! Where **Defender of the Crown** boasted outstanding graphics but kept shh about its lasting qualities, **Rocket Ranger** can hold its head up high on both accounts. The be-all-and-end-all in computer movies so far.



MOVIE TIE-INS

PLATOON Ocean

Ocean took a risk producing this conversion of Oliver Stone's controversial and harrowing insight into a young soldier's experiences of the Vietnam conflict (being an 18-rated film, the game's targetted audience would have no idea of the nature of the license) but luckily, the programming team created a title which was not only the most accurate film license ever, but also a fantastic game in its own right. Over five loads of totally atmospheric graphics and sound, the player would become that soldier, escaping the horrors of the pursuing VC's in lush jungle and dank, underground caverns, as well as coping with the traumas within your own platoon.

And then there's...

Aliens (the UK edition) Electric Dreams

Now released at budget price, **Aliens** managed to capture the drama and suspense of the action/horror movie from which it was licensed, reeling the player into a nightmarish look at colonisation in the future.

BEAT-EM-UP

IK+ System 3

All previous karate beat-em-ups relied on the tried and tested formula of two martial artists battling it out against a pretty backdrop. System 3, however, introduced a previously unheard-of aspect into the tiring genre - a third fighter. The unpredictability of the computer-controlled opponent, as well as the automatic doubling of adversaries, gave IK the necessary freshness which it needed to catapult it to the top of the beat-em-up league. Melbourne House also opted for three fighters in their third Exploding Fist game, **Exploding Fist**, but met with considerably less success, largely due to the fact that IK was a much better product in terms of both look and feel.

And then there's...

Target Renegade Ocean

Who needs a pair of pyjamas to kick someone's head in? Ocean certainly didn't when they released their sequel to **Renegade**, flattening the opposition in one fell swoop. Cartoon-quality sprites are the order of the day in this fun (if morally suspect) arcade romp.

ARCADE ADVENTURE

LAST NINJA II

System 3

With the release of **Last Ninja**, System 3 had created a state-of-the-art when most people were becoming increasingly ill at ease with the dwindling quality of C64 software, creating graphics on the 8-bit machine which, at a distance, could be easily mistaken for an Amiga. **Last Ninja II - Back With A Vengeance** (to give it its full title) improved still further on **Last Ninja**'s presentation, and also offered the player a lot more in terms of gameplay, to boot.

Set in 1980's Manhattan, the Last Ninja's great, great, great...grandson must destroy the arch enemy of his ancestor who has materialised in the 20th Century, threatening world domination. Spanning a massive six loads, **Last Ninja II** must go down in history as one of the most visually impressive games ever to be seen on any 8-bit home computer.

And then there's...



Head Over Heels

Ocean

What was well-worn on the Spectrum seemed like a breath of fresh air on the C64 when Ocean released the forced-3D perspective **Head Over Heels**. Although the novel approach to graphic presentation slightly overawed even the most cynical of reviewers, it was the game's brain-bustingly addictive puzzle-solving gameplay which made ultimately made it a hit.

Staff of Karnath

Ultimate

Who can forget one of the first arcade adventures on the C64, and certainly the first real hit for Spectrum Knight-Lorers Ultimate. Putrid graphics but maddeningly playable search and collect gameplay made sure of **Karnath**'s success

SPORT

EMLYN HUGHES INTERNATIONAL SOCCER

Audiogenic

Audiogenic aren't usually synonymous with 'classic' software, but that changed when **Emlyn Hughes** slipped onto the market without so much as a whisper. An outstandingly realistic football simulation, the title refused to be beaten by horrendously blocky graphics reminiscent of the positively ancient **International Soccer** (which, until **Emlyn Hughes**, reigned supreme as THE football game). Incorporated into the game is a mini-management program which allows the player to completely overhaul his team, as well as launch into the hectic world of international football, complete with a league and 'friendlies' when no games are planned. Next to **Emlyn Hughes**, all other football games begin to weaken at half-time.

And then there's...



COIN-OP CONVERSIONS

RAINBOW ISLANDS

Firebird

The sequel to the hit coin-op and computer game **Bubble Bobble**, **Rainbow Islands** again features old chums Bub and Bob, now back in human form after their excursion as bubble-blowing brontosauri. The evil Baron Von Blubba is up to his old tricks once more, capturing the inhabitants of the Rainbow Islands and imprisoning them at the very top of the highest mountains. Rescue your pals on each of the seven islands in this, the most accurate conversion of an arcade machine ever. So many coin-op licenses fall down on one point - machine capability - and it just so happens that the C64 is capable of reproducing the goings-on in **Rainbow Islands** to a remarkably accurate degree. Thanks to Andrew Braybrook's **Graftgold** development team, it's possible to recreate the atmosphere of the 2 Megabyte arcade machine in your bedroom.

And then there's...

World Games

US Gold/Epyx

International stardom awaits the lucky contestant in this eight-event jamboree. Cliff diving, caber-tossing and rodeo make up just some of the sports you can turn your hand to in this, the most playable, addictive and aesthetically impressive of Epyx's **Games** series. It's now available on the Kixx label at £2.99, too!

Decathlon

Activision

Ages old yet still the most impressive title of the whole decathlon genre. Joystick waggling-a-plenty, and it's all backed up by some really well-animated athletes. It's now at £1.99 too, courtesy of Silverbird.

Operation Wolf

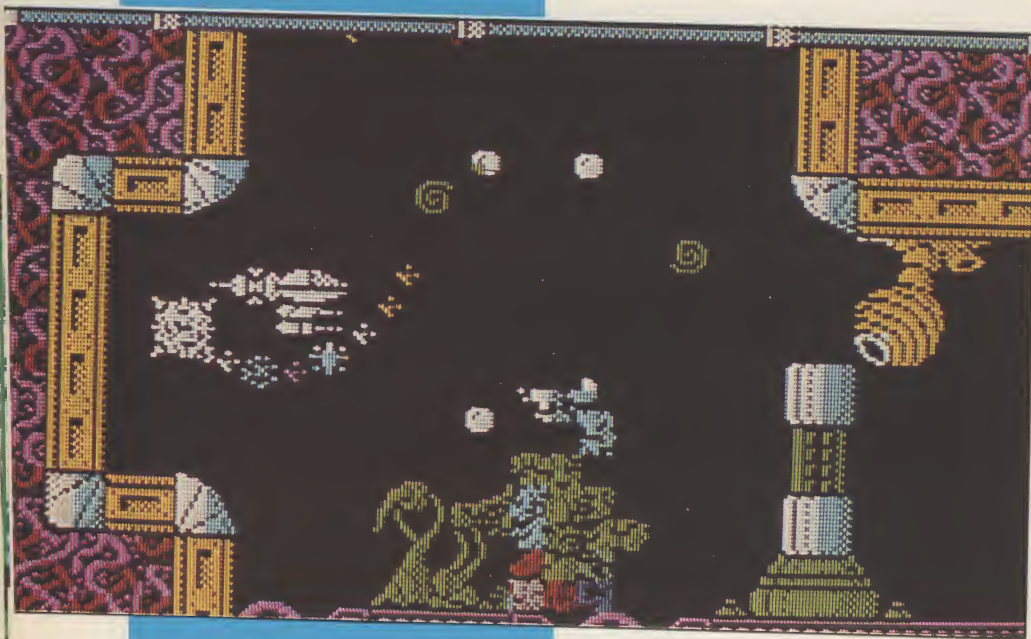
Ocean

The Amiga conversion had amazing graphics and played like a brick. The C64 had workmanlike graphics and played like a dream. One of my all-time favourite games on the C64, **Op Wolf** takes on the 16-bits and wins, demonstrating the fact that pretty sprites are worthless if the gameplay is naff.

Road Runner

US Gold

The look and feel of the coin-op original shines through in US Gold's representation of everyone's favourite 'Birdius Speedius'. Although a painful multiloop put many cassette buyers off the game, once you get your hands on **Road Runner** it's a task to put back down.



Cybernoid Hewson

Causing a sensation when it first exploded onto the Spectrum, Cybernoid still has me, and probably every other reviewer who played it, totally hooked. It has rightly been named a 'legend in its own time', and was so successful that its programmer, Raffaele Cecco, soon came up with its sequel, Cybernoid 2.

There are many shoot 'em up games. So why is Cybernoid so outstanding? Simply because of the number of moving sprites on screen at one time without any noticeable colour clash. The tune playing throughout is of admirable quality but can be changed for exceptional sound effects if preferred. Five types of special weapon can be used to dispose of the wide range of enemies: mines, bombs, seekers, bouncing bombs and shield. The game's three levels hold a multitude of pirate ships, honeycombs and guns to provide hours of blasting action.

SPECTRUM

The best selling home computer in Britain has the largest choice of software. Whether it's the 48K, 48K+, 128K, +2, +2A or +3 version of the computer, all the games will work on it. Nick Roberts picks ten Spectrum games any owner shouldn't be without.

Batman - The Movie Ocean

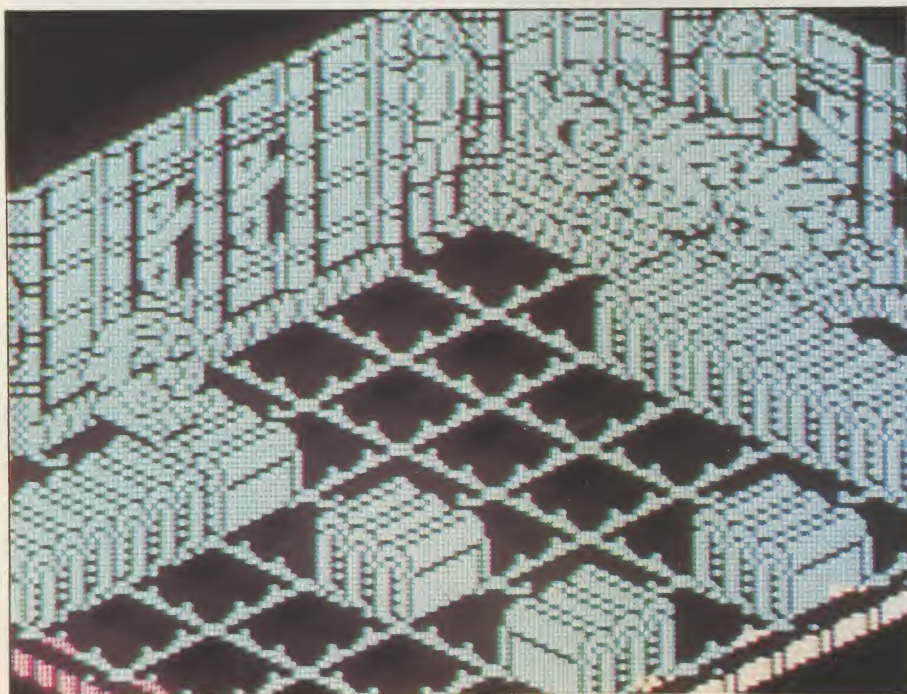
A brand new release but definitely one of the best games to appear on the Spectrum. There is no way to classify Batman in game style because it incorporates all the favourites. Level one, for instance, involves exploring Acid Works, where Jack Napier falls into the poison and turns into The Joker. It's set out in a platforms-and-ladders style with detailed sprites based on the film characters and some challenging maze layouts and is followed by a car racing style level where you control the Batmobile as it speeds through Gotham City. Part three is a puzzle section in the Batcave, part four a Batwing flying section and the final confrontation with The Joker in a cathedral repeats level one's style. With so much variety there's bound to be something to appeal. Batman - The Movie almost guarantees endless playability and puts a lot of other full price games to shame.

Driller Incentive

Driller could be classed as a breakthrough in programming technology. The solid 3-D technique (Freescape) Incentive pioneered and used in this, puts you into a 3-D world-in control of an excavation probe with which you must urgently drill all 18 sectors of the moon of Mitral to prevent a lethal build up of underground explosive gas. The great thing about Driller is that objects can be viewed from any angle imaginable. The probe can be tilted up, down, sideways and rotated to give different view points. Attached to a jet it can even fly. With over 20,000 billion possible views, the challenge of of surviving Mitral's deadly automatic defence system and the drilling itself, the game will keep you occupied for ages. Driller was followed by Dark Side and Total Eclipse, also in Freescape, but being the first still remains a firm favourite.

Head Over Heels Ocean

When Head Over Heels was first released in April 1987 everybody went mad over it. It had everything, cute cuddly characters, excellent graphics and sound plus it was all in isometric 3-D. There are two characters in the game, Head and Heels. Head is a type of flying reptile and could jump twice his height while Heels has piston like legs which means he is a powerful runner and can leap his own height. When they are together Head sits on Heels' shoulders. Written by that brilliant programming duo Jon Ritman and Bernie Drummond you have to use the different abilities of both characters together to escape from a 300 screen castle. Conquering some of the obstacles in your way takes a certain amount of thought but it is all well worth it. Of all the 3-D isometric games that were released around the time of Head Over Heels this has to be the most playable.



CCEG

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R-Type Electric Dreams

A conversion of the Irem Corporation arcade machine R-Type has to be the shoot 'em up to end all shoot 'em ups. The amount of colour, excellent graphics and sound the programmers managed to cram into the game and still keep the speed up will truly amaze you. Some of the sprites used almost fill up the whole screen and you can have great fun collecting more powerful weapons and blasting the aliens out of space. There are seven levels to be conquered by blasting your way through the literally thousands of aliens to get to the end of level nasty. The action gets extremely frantic towards the end of the game, only the true arcade genius will survive the pace. R-Type is another essential game for any Spectrum owner.

Renegade Ocean

If you are looking for a beat 'em up game then Renegade has to be the best one to go for. This style of game has been copied over and over again but it is the originals that are always the best. The idea was so successful that the sequels Target; Renegade and Renegade 3 The Final Chapter went on to be made in a similar



style. Instead of the player beating enemies up and only being able to move left or right Renegade gives the freedom of moving up and down the play area as well. This means that you can manoeuvre the hard man into the correct position to deal a good blow. Weapons can also be picked up to use against the adversaries. Renegade holds plenty of surprises for the hardened games player, a good arcade style game to get aggressive with.

Chuck Yeager's Advanced Flight Trainer Electronic Arts

Chuck Yeager's AFT is simply one of the best flight simulations available for the Spectrum. The solid 3-D graphics create an airborne world that is extremely realistic and fast too, quite an achievement when you look at how much updating the computer has to do. Chuck Yeager is well known for having flown just about every plane produced. This game reflects this feat with no less than 14 planes for you to get to grips with, including an SR-71 Blackbird reconnaissance plane, a Sopwith Camel and the 'Glamorous Glennis' X-11! A host of options are available, allowing you to fly different missions, change conditions and even go through an instruction flight where you follow and mimic the plane in front. Chuck Yeager's Advance Flight Trainer is excellent if you're looking for a realistic simulation of some of the best planes flying today.

Continental Circus Virgin

Car racing games have been probably the most cloned in the Spectrum's long life, starting with such games as Chequered Flag where an undetailed car was driven around a plain background. One of the

latest racing games (of which there are many this Christmas) to arrive is the arcade conversion of Continental Circus. For ultimate realism the coin op had impressive 3-D glasses stuck to the front of it which home computer versions miss. The conversion is nonetheless incredibly good. You race around various tracks in different countries, each one has its own background that scrolls when you turn a corner. Signs, pits and other cars all whizz past on either side. The game would make a good simulation just with this, but then there are weather conditions! Yes that's right, in some of the levels rain actually forces you to pull into the pits to change tyres. Continental Circus is well programmed, and one of the most realistic racing games around.

Polearn Sheol Software

Good adventure games are hard to come by these days, having proved a rather small commercial market; they're all either too simple or just boring. Polearn is neither of these though. Set in a sleepy Cornish village it's presented as a mixture of text and graphics. Written using PAW (Professional Adventure Writer) from Gilsoft (still available for budding creators) Polearn allows a high level of interaction with other characters, unlike many other PAW creations. The story is its best aspect with a ghostly tale of unexplained accidents and a sound of sobbing when there's no one around. You play Marcus Thornton who is visiting Polearn to recover from the shock of his wife's death in a horrific plane crash. The strange happenings in the village are enough to keep any adventure fan interested for a long time. Unfortunately Polearn is only available for 128K owners. Polearn is a brilliant adventure game, one of the best for some time.

The New Zealand Story Ocean

An excellent arcade conversion, New Zealand Story is packed full of cute little characters and infuriating maze layouts. All the graphics in the game are of excellent quality with detailed sprites and a variety of weapons, some which give a very interesting effect. The story behind it all is that big Wally the Walrus has stolen all your little Kiwi friends and you, Tiki Kiwi, are now their only hope. You must explore each level, killing all the enemies you encounter, picking up the bonuses they drop and rescuing your mates. This would be quite easy if it weren't for the nasty big monsters at the end of each level. Level one has an enormous whale and two a mean octopus. Tiki Kiwi can fly if he grabs hold of balloon, swim with his snorkel, and get around in whatever the nasties leave behind. The New Zealand Story was an addictive arcade machine and is now an equally addictive computer game, with the added attraction of saving on the 10 pence pieces.

down a twisting, roller coaster road, with no way to slow or stop, forces quick decisions and gets the adrenalin flowing. Barriers appear with unnerving suddenness and waves of aliens can be really vicious. For a fun if worrying blaster with a novel setting, look no further than Eliminator.

THE SACRED ARMOUR OF ANTIRIAD

Palace Earth

The future. Once ravaged by nuclear war, the naturalised humans are now running from advanced invaders. Tal, the savage hero, must infiltrate their base and disrupt the source of their power. The beasts of the forest are slain with thrown rocks but the armour of the title and its additional devices are nearby, enabling flight and defence against stronger adversaries.

Antiriad immediately impresses with its wonderful graphics: beautiful definition and realistic animation, particularly on Tal himself. These lead you into a strong arcade game (with maze undertones) which, although not particularly large, will hook you for hours, grabbing energy to keep Tal and the human race alive.

SPINDIZZY

Electric Dreams

Enter GERALD, a robot whose job it is to map out a geometric world, collecting diamonds on the way. The landscape is a collection of slopes, catwalks and plateaus, linked in part by lifts. Gravity and inertia affect GERALD so there are Marble Madness-style struggles to keep him from falling, wasting precious time, as does contact with the occasional wandering guard. Switches, affecting lifts and walkways, mean mapping strategies have to be used. Atari's cult coin-op, Marble Madness, bred a number of copies but Spindizzy was the only one to add other new elements to the original design while still keeping the arcade games atmosphere. To keep GERALD on the playing area is challenge enough — exploring all screens and correctly activating switches doubles it.

STRIDER

US Gold

The latest Capcom coin-op conversion, a big hit in the arcades and still popular now, sees the athletic hero, secret agent Strider, battle through five levels. He's capable of fantastic acrobatic feats and can grip sheer surfaces. He needs these qualities to navigate the intricate networks of platforms, and needs his laser-sword to swipe death at his enemies.

Strider's instant appeal is generated by the exhilarating feeling of running around platforms, somersaulting high in the air, clinging impossibly to scenery, and flashing a sword at a vast array of monsters. If that makes Strider sound hectic, that's because it is, and it's this excitement that keeps you playing.

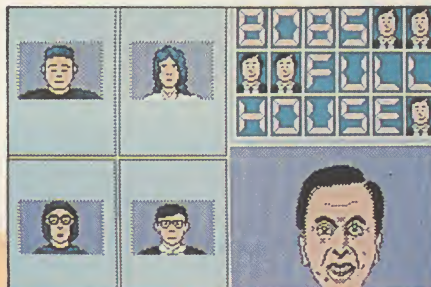
MERCENARY

Novagen

This classic game, which first gained recognition on the C64, should need no introduction, but just in case...

Your ship has crash-landed on the planet Targ. To escape, you must find a replacement craft plus a Nova drive system to enable interstellar travel. These and many other items are spread throughout the many locations of the 3-D vector landscape and must be found — and used with the aid of Benson, your computer.

Mercenary brilliantly combines 3-D flight combat, a sub-genre in itself, with the ever-popular exploration arcade adventure, and a touch of strategy in the way characters/forces are interacted with. The vast new world to explore can even be expanded with a supplementary program, The Second City, whereupon Mercenary's involving scenario becomes more realistic still. Inescapable, in fact.



BOB'S FULL HOUSE

TV Games

Ever seen the Saturday night 'family' quiz show? Well at least you're spared Bob's terrible and prejudiced jokes in the computerised questions-and-answers game, partly based on bingo.

For one to four players, the computer making up numbers if there aren't enough people available, a graphic of Bob's head (eek!) is animated as a text question appears. The first player to hit his buzzer key can answer the question by typing it in, using a dotted line a la Hangman as a guide. A correct answer lights a number on the player's bingo card, and rounds are won by lighting particular groups of numbers (the four corners, the middle line and the whole card). An incorrect answer 'wallies' the player — he's not allowed to answer the next question.

Quiz games are in short supply for the Amstrad, particularly those that are also TV programmes and, to a lesser degree, board games! To get the most out of Bob's Full House's potential you do need the full complement of players, although three people is okay. There are a reasonable spread of topics amongst the questions and together with the desire to beat your opponents to the buzzer and complete a round, Bob's Full House is worth a try.

TEMPEST

Electric Dreams

A conversion of Atari's cult vector graphic coin-op, Tempest uses a wire-frame network to display a plan view of a 'pit'. As various types of aliens crawl up the walls, the 'zapper' the player controls is steered around the rim of the pit and shots down to kill them.

Conversions to other formats were generally weak but the Amstrad version was a classic interpretation of this unashamed mindless blaster. The loud action gets faster and more hectic as levels are completed — and it's a pretty chaotic game to begin with. A simply brilliant addictive shoot-'em-up.



GAMES: SUMMER EDITION US

Gold/Epyx

The famous Games series has come a long way and Epyx have had to scratch their heads to think up unconverted events. In this latest multi-event product, diving, velodrome cycling, rings, asymmetric bars, hammer throwing, 110m hurdles, pole vault and archery. As usual, up to eight players can take part and a host of options are at hand.

Although three of the events (diving, pole vault and cycling) have been done before by Epyx, they're programmed much better and more creatively here and coupled with some interesting new ones. Archery is probably the most accessible of all eight events but both rings and asymmetric bars show a new, complex type of event, requiring combinations of moves to gain a good score.

As with any of the seven Epyx products, it's best played with some friends, where it generates a brilliant competitive spirit (sometimes unfriendly!). A variety of control systems and comprehensive, user-friendly options all help to make this a great multi-event sports game.

ALSO HIGHLY RECOMMENDED FOR THE AMSTRAD

INTO THE EAGLES NEST Pandora
CYBERNOID 2 Hewson
OPERATION WOLF Ocean
FORGOTTEN WORLDS US Gold
RICK DANGEROUS Firebird
SORCERY Virgin
BARBARIAN II Palace
TRAILBLAZER Gremlin
IKARI
WARRIORS Elite
HIGHWAY ENCOUNTER Vortex
CAULDRON Palace

CCEG

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MSX

PENGUIN LAND KONAMI

Probably the most well known MSX title of them all, Penguin Land is very, very cute indeed. This one rode the wave when the original Tsumani of MSX machines arrived from Japan, a game ahead of its time which even now is still totally playable. With a Japanese mentality pervading the whole game Penguin Land sees a penguin venturing across the Antarctic, visiting the outposts of each country around the snowy wastes. Holes in the ice floor pose problems as do the icy denizens, intent on halting the sight-seeing. The gameplay is very simple with left/right/jump forming the main bulk of the tactics but it's an endearing title of major historical significance. A software classic.

NEMESIS 3 KONAMI

The close ongoing hand-in-hand relationship between coin-op manufacturers Konami and the MSX standard has seen Konami sweep the board when it comes to cartridge games. The latest in the ever-ongoing series, Nemesis 3, is loosely based around the coin-op Vulcan Venture and unsurprisingly continues the battle against the infamous Bacterions of Nemesis past. Konami have a habit of compressing a staggering amount of graphic detail into their cartridges. Gone are the humble days of Nemesis with mediocre graphics and twee Spectrum-esque tunes (although admittedly good for the time). Nemesis 3 expands on the theme to immense levels with 8 levels of outer and inner space action and as ever excellent

use of the 8 channel SCC chip (Amigas watch out!). The toughest of the series so far, Nemesis 3 reaches new heights in opponents (fiery Phoenixes, skeletal robots and a mothership that dwarfs anything seen in R-Type). There are also secret levels, four types of ship to select with differing arsenals, VERY powerful progressive weaponry to pick up and even some snippets of speech in there. What's more you can also get to meet enemies from the previous games when the evil Bacterions start messing with the fabric of time — classic shoot-'em-up action.

SALAMANDER KONAMI

And if Nemesis 3 has wetted your appetite for destruction then try out the top notch coin-op conversion of Salamander. Boasting two-player action and a combination of horizontal and vertical action, Salamander was THE game for the MSX last year. The SCC chip works overtime to recreate near faultless renditions of the arcade tunes and Salamander provides a far stronger challenge than its coin-op cousin — undoubtedly the toughest Konami game yet. Coin-op conversion fanatics will love this even though it isn't totally faithful — Konami do insist on expanding the original to make for a much better game; something they always do well.

ROBOCOP OCEAN

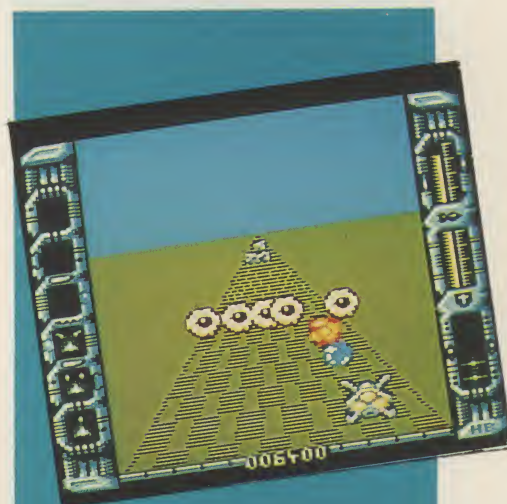
Amongst all the cartridge games present in this list there's still room for tape-based games. Ocean have been leaders in the field almost constantly since their inception and are one of the leading lights when it comes to MSX support. RoboCop needs no introduction as a concept. As a shoot-'em-up it's among the best around despite its slow pace and a Spectrum emulation mode. Miss it at your peril.

OPERATION WOLF OCEAN

Ocean come up in the top ten once more although again the Spectrum emulator comes into effect. Taito's classic coin-op smashed all records and the computer rendition likewise. The MSX is never too good at horizontal scrolling (the Konami games prove it) but Operation Wolf copes admirably, turning out very respectably indeed. Senseless over-the-top violence has never been so good as a lone soldier fights through eight battlezones to rescue hostages with nothing more than a blazing Uzi to hand.

GAMES MASTER KONAMI

Where would thousands of ardent MSX gamers be without this little gem of a cartridge? Banging their heads against brick walls, no doubt. All MSX owners know just how tough the cartridge games are and any help is most welcome. The wealth of options to be found within this unassuming cartridge (for two port MSXes only) is truly outstanding - just plug it into Port 1, switch on and you can select up to 99 lives and any level of the game in Port 2. Options also exist to change game ranking and store the situation to tape or disk. Let's just say if you have a 2 port MSX then this is an essential peripheral.



CPC

ELIMINATOR Hewson

As an Eliminator you must travel from planet to planet, destroying all who cross your path. Speeding down highways, there's little room to manoeuvre as you dodge between barriers and jump with the aid of ramps, even travelling on the ceiling's of tunnels. A standard cannon can be updated by collecting icons and weaponry can then be selected between.

Eliminator is an individualistic shoot-'em-up that has pace and generates excitement due to its setting. Charging

CONSOLES

SEGA MASTER SYSTEM

OUTRUN

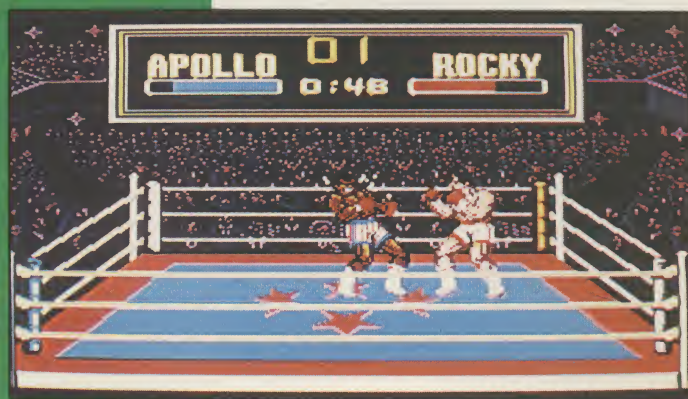
Still the most accurate conversion of the coin—op (and so it should be — Sega did them both!), **Out Run** gives all Sega owners the chance to hop into an extremely rare Ferrari Testarossa Convertible and high—tail it across America. What made **Out Run** so successful both in the arcades and on the console was the ability to choose your own route — there are four endings, all different, and these too are a faithful



representation of the coin—op screens. One of the few Sega titles worth the obscene 25 quid asking price.

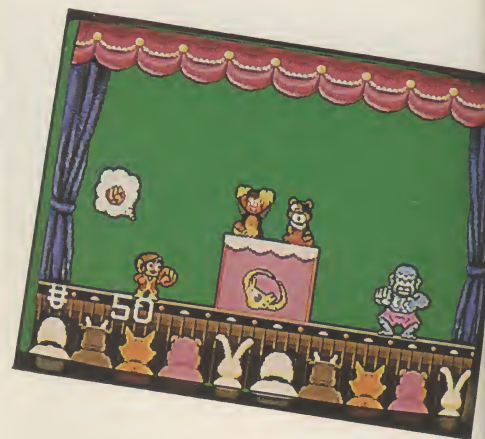
ROCKY

The first Sega cartridge to really show off the machine's graphic capabilities. Huge boxer sprites convey the action in this licensed product which places you, as Rocky 'Italian Stallion' Balboa (you know, that little Stallone chap) in the World Heavyweight Championship ring against the boxers from each of his four films — Apollo Creed, Clubber Lang and Ivan Drago. Before each match, you are given the opportunity to participate in a bout of training with your coach, Micky; these screens too are 'made' by the enormous character graphics (Rocky really



does LOOK like Rocky — sorry — Sly!). Perhaps best as a two—player game, **Rocky** rates even now as arguably the most technically stunning game on the Sega.

SEGA MEGADRIVE



ALEX KIDD

As the current craze is for 'cute' games, it was only a matter of time before one was released for the 16—bit Sega. Battle your way through the many levels, collecting cash along the way; cash which can be used to buy useful items at the object shops. Be prepared to lose more than your dosh in this game, though, for the bonus stage takes the form of a 'Stone, Paper, Scissors' contest between you and a bulky native, in which the stakes are high — your clothing!

Arcade quality presentation and gameplay make what seems at first glance a rather repetitive **Mario Bros** clone into an enjoyable, challenging adventure.

SPACE HARRIER II

If you've ever seen the Megadrive in action, you'll have realised that the console is more than slightly proficient at handling first (or even second)—person perspective 3D. And probably the most impressive demonstration of this lies within the updated version of their arcade and 8—bit console smash.

You may think I'm overstating the facts when I tell you that **Space Harrier II** is arcade perfect in every way imaginable, but I'm not. You will never see a better conversion of this daddy among 3D coin—op machines anywhere else, and that's no joke — 3D is incredibly smooth and, unlike every other attempt at **Space Harrier** so far, the oncoming sprites appear, whirl around and retire without even a hint of bounce, wobble or flicker. **Space Harrier II** is definitely one to consider — it looks great, sounds amazing and plays as though you were tackling the upright version of the coin—op.

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PC ENGINE GAMES TO BUY

So compact it'll fit a handbag, and with game ROM-cards the size of your plastic money, the Engine is your very own arcade coin-op in the pocket. Games are Japanese, not translated into English and not available from mainline suppliers. When it comes to sound, graphics and size of game they easily outclass other consoles. Dominic Handy gives you a taste...

CHAN & CHAN

Probably the best known arcade adventure on the PC Engine. Choose to be either Kato or Ken Chan and trek over, under and across all sorts of terrain,

notch detailed graphics, smooth animation and supersonic sound track combine to produce a real galactic experience.

R-TYPE I and II

Without doubt the best home conversion of Irem's classic horizontal coin-op shoot-'em-up — which spawned many clones. Although split onto two ROM cards it's well worth buying, with the first recommended for newcomers to R-Type, the much harder second for veterans. Both show the PC Engine's 16-bit graphics chip at its best — coping effortlessly with full-screen scrolling while a storming soundtrack thunders away in the background.



encountering normal (and extremely abnormal) characters inhabiting this fantasy world. Packed with cartoon-style humour, many curious ways of zapping the locals, money to be picked and gambled for extra life force etc., this is simple, but mind-numbingly addictive.

GALAGA 88

The watchword for PC Engine owners is addictiveness. Almost every single game has this secret special quality that keeps you glued to the machine for hours and hours. Galaga 88 may start out as a simple shoot-'em-up, but a few levels in and you start to realise there's more to this spacey blast than meets the eye. Top

ALIEN CRUSH

For something a bit out of the ordinary, take a look at Alien Crush, a classic pinball game with bio-mechanical overtones. Alien Crush features most attractive graphics. Full of subscreens, the table splits into two, each adorned with Giger-influenced monsters ready to snatch your ball away and spew it out elsewhere. Great combination of eerie music and monsterish graphics makes Alien Crush a must. Just one bout can continue at a frenetic pace for hours (literally) — not merely another pinball game, more of a new world.

WINNING SHOT, BASEBALL, WORLD COURT TENNIS

There are plenty of sports games for the PC Engine. Not boring managerial games: as Winning Shot shows. Slow, boring simulations (like golf, baseball and tennis) get turned into fun and playable games. Covering the aforementioned sports, Winning Shot, Baseball and World Court Tennis provide the perfect library for any armchair sports fan. Smothering the strategic elements with a thick layer of graphics and sound, all three allow at least two players competing at the same time (Winning Shot and Tennis allow four). Add the fact that every player can choose their own character (from around 40 men and women), these PC Engine sports games push top notch games for other computers back into the changing rooms. World Court Tennis features the most competitive gameplay since Match Point; Winning Shot is packed with 18 entirely different and challenging holes, plus tournament play; and Baseball provides non-stop action with superb animation. It's hard to pick the best from these three — any sports fan worth his balls would have them all.

VICTORY RUN

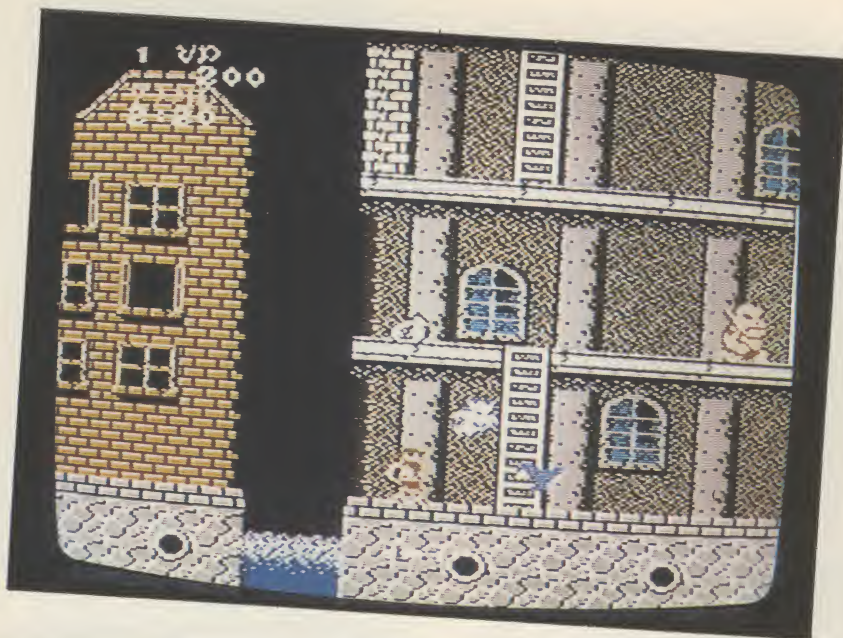
There aren't many racing games on the PC Engine, surprising considering its smooth, scrolling capabilities (thanks to the 16-bit graphics chip). Victory Run realistically conveys the feel and limitations of a road machine (a car in the Paris-Dakar rally). Pre-race preparation is essential, putting the right amount of emphasis on speed and gears, not forgetting the brakes and tyres. Driving contrary to the way your car is set up results in serious time loss. Each country on route contains well-designed graphics (the Eiffel Tower in Paris, for example) giving the atmosphere of a real intercontinental trek. Rip-roaring fun.

PAC-LAND

For those who like their fun cute and cuddly (with plenty of 'meanies'). Just like the arcade machine (heard that before somewhere?), Pac-Land features vivid colours and distinct graphics. This is probably the most original of the Pac-Man series: the eponymous character finally gets his comeuppance when Mrs Pac finds out he's been two-timing with a fairy. Thrown out of the family home, Pac-Man treks across Pac-Land to find his beloved fairy (these Japanese translations get worse). The journey through his homeland is sprinkled with irate inhabitants and attractive backgrounds. A challenging game!

Also recommended:

SON SON II, SHANGHAI, FANTASY ZONE, VIGILANTE, DRUNKEN MASTER.



GHOSTS 'N' GOBLINS

The Capcom coin-op cult game now makes it across to the Nintendo in fine form. Arthur the Knight is out to rescue his beloved princess from ghosts, goblins, zombies and the Great Demon himself. A time for derring-do if ever there was one. Platform action is one of the Nintendo's strengths, and Ghosts 'N' Goblins keeps the tradition alive. Playability is out of this world, the wealth of detail in the graphics too, but atmosphere makes it superlative.

R.C. PRO-AM

One of the most playable race games ever, and programmed by a British development team! R.C. PRO-AM has you racing those shoe-box-sized radio controlled cars so perfect for running down old ladies and upsetting dogs! It's tricky controlling them as they race around the hairy courses, and that's before you pick up and add extra engine parts, speed ups and traction to your

hot rod. Watch out for barriers, oil and other cars — pick up letters to form the word NINTENDO and change to a better car. Use missiles and bombs to delay competitors — it pays to play dirty. Slickly programmed, with fast paced tunes and increasingly faster cars and worse terrain and weather, this is as much fun as the real thing.

RAD RACER

You can't go wrong with good 3-D racing games and Nintendo have a winner here. Eight courses through some of the worst weather you could imagine, racing against Lamborghinis, Ferraris, Porsches and more, including Sunday drivers! Pick a Ferrari or a Formula One racer and burn rubber: twists and turns, day and night driving. With three tunes to choose from, Rad Racer is fast paced, fun and frighteningly addictive.

THE LEGEND OF ZELDA

Princess Zelda has been captured by evil Ganon, who intends to rule the world with terror and evil. The only means of defeating Ganon is to find the Tri-Force, but Zelda's split it into eight pieces and hidden them in the Underworld. Link, the hero, is sent in to find and use them on Ganon to save the world and Zelda. Denizens aplenty in the game's 230 plus rooms pose problems and threaten to stop Link, but Traders can be visited for advice and weapons, and fairies provide life points in the form of hearts. IF you want challenge you can't get it bigger than this: serious arcade action with mega-opponents, puzzles, atmosphere, music, and Japanese style graphics. Watch out for Zelda 2 - The Adventures of Link around April next year.



NINTENDO

With the manufacturers repeatedly promising a big push for their console in Britain, the quantity of games available is disappointingly small, with new releases few and far between. Robin Hogg makes his recommendations...

SUPER MARIO BROTHERS

This definitive platform game took the console world by storm and accelerated Nintendo in the States to the top in one swift easy move. Its plot and mechanics are stunningly simple - Princess Toadstool and the people of the Mushroom Kingdom have been spirited away by the Koopa Turtle Tribe. Mario and Luigi, two athletic brothers, are called to her rescue. So they leap through four worlds, with many zones, including underground scenes, bonus screens and a whole lot more. They collect coins by head butting bricks, arm up with stars to throw fireballs, pick up a Starman for invincibility and more.

What with perfect skill level and simple left/right/jump action, finding extra lives, secret bonuses and twee tunes Super

Mario Brothers is incredibly addictive, and is given away free with every Nintendo.

SUPER MARIO BROTHERS 2

The same basic ideas, but vastly improved upon with vertical sections and a strong strategy element with four characters to choose from, each with their own unique abilities and super strengths. Now the Mario team can do almost anything - ride magic carpets, dig into the sand to unlock chests, use magic potions to enter sub-zones and hitch lifts on creatures to avoid quicksand, waterfalls, chasms and other creepy crawlies. There's egg fights and mega baddies, seven worlds plus countless secret levels and a life giving one-armed bandit bonus screen. It's IMMENSE and playable beyond belief.

LIFE FORCE

Life Force takes the classic coin-op Salamander and shows everyone how to do proper conversions with great graphics and the original rock and roll soundtrack. Six levels of pure arcade action, including dual player mode, has you battling the Bacterions through hellish worlds of fire. Survive this and you're ready for anything!

TRACK AND FIELD 2

It's international sports day with this imminent sequel to Track and Field. Participate in eight days of 15 gruelling events, with world class athletes competing in fencing, triple jump, swimming, clay pigeon shooting, hammer throwing and a host of other events, including canoeing with turbo canoes! There are gold medals to earn, opening and closing ceremonies to attend, speech, and the best animation around. Great sports action with more than enough events for any armchair sports enthusiast.

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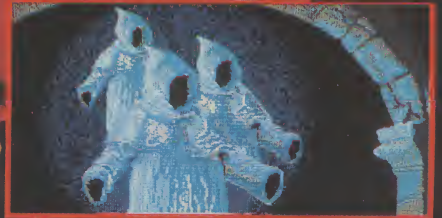
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GET IT... BEFORE IT GETS YOU

OOZE



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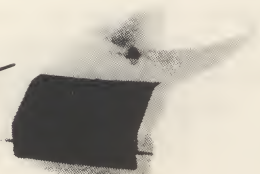
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WHICH

Imagine driving a car with a keyboard in the place of the steering wheel and foot pedals! How about sitting on your bike with an extended ASCII keyboard! Not likely? Unless you drive a tank or don't mind bruises and bumps on your head, you'll be looking for a better way to control your machine. So if you're going to score top points on the latest shoot'em

Way back in the home computer's infancy players were expected to improvise using the old faithful keyboard to play those primitive conversions of the early arcade games. That was until the console machines came to life, which brought dedicated joysticks to the world of home computers. From there it was a simple matter of incorporating joystick ports to the humble home computer, into which the console joysticks could be plugged. With Atari a major player in the console war, the joystick port was modelled to suit the Atari peripheral, and to this day, home computers have followed the Atari compatible route, all with the exception of 2 major systems. Having acquired all rights to the Sinclair computer range, Amstrad decided to cash in on the lucrative joystick market and modified the Sinclair joystick ports in order to help their customers in the decision to pur-

chase Amstrad specific joysticks (Spectrum+2 onwards). Result: Third party suppliers deliver compatibility and freedom of choice with a converter.

IBM decided that digital control wasn't good enough for their PC range and created the analog games controller for their machines. This enables variable control rather than on/off switching and, provided the software adapts accordingly, creates a realistic effect of control. All PC compatibles can incorporate this games controller card.

QUICKSHOT WIZMASTER QS-118

Spectravideo, £11.95

Another novelty! A joystick that pulls apart (intentionally...). Wizmaster consists of a switchable multi-adaptor for various computers and consoles and a base controller. Directional control is via

So what advances has technology brought to the controller area. Apart from replacing unreliable and flimsy switching hardware with tough waggle-proof designs incorporating longlasting microswitches, the industry has tried to introduce some successful and some not



CCEG

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STICK

up, you'd better look for a very specialised man machine interface, a games controller in other words. Ah, we're talking about joysticks now, I suppose? Well, not necessarily, not anymore. Things aren't that simple. What do you call a joystick without a stick? And why would you return from your local computer shop with an electric chair?



so successful gadgets. The most popular item is of course the Rapid Fire Action. There is some ambiguity in the way that this mechanism is supposed to operate. Originally it was introduced to cheat on software, which only allowed the player to fire single shots by forcing a retriggering

each time (ie fire button bashing). The Rapid Fire Option would be activated with the fire button and would send a stream of pulses to the computer, without the player having to release the fire button. Today there are few games limiting the player in this way, but some Rapid Fire systems (or Continuous Fire options) will fire without the player having to keep the fire button depressed, freeing his fingers for other hectic activities. Some joysticks provide variable rate firing by changing the pulse frequency.

a joypad on the lefthand side, into which you can screw either a round knob or a long shaft. On the righthand side resides the armoury control with two small fire buttons and extra support from a central Auto Fire switch. Stick action is clickless. Righthanders beware...

CRYSTAL

Powerplay, £14.99 Standard, £16.99 Turbo with Autofire

Microswitch action all way round with grip moulded handle and unusual square fire buttons. Stick travel slightly longish and grip rather thin for larger hands. Good action in either handheld or tabletop position thanks to the rubber suction cups. Available in designer style colours.

Others have introduced a slow motion facility by slowing down the computer's activity with wait states, while enabling the player to outspeed the software. Modern PCs cause a problem with gameplay already, as clock CPU speeds have been increasing by multiple factors. Most of these allow to set slower speeds for software compatibility or easier gameplay. Several attempts have been made





COBRA

Euromax, £11.95

Mean-looking action joystick with solid handgrip and no less than eight microswitches, two body mounted fire buttons, trigger and thumb firing switches and Auto Fire. For tough guys only...



CCEG

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Spoilt for choice...

ATARI

CX40	£4.99
Proline Super Controller	£7.99
Trackball CX-80	£7.99

CHEETAH

Starprobe	£14.99
Challenger	£4.99
Mach I	£10.99
125+	£8.99
Defender Light Gun	£24.99

DYNAMICS MARKETING

Competition Pro 5000	£14.95
Competition Pro 5000 Clear	£15.95
Competition Pro Extra	£16.49
Competition Pro PC	£15.95
A-D Games Card for PC	£24.95
Pro Glo	£17.50
Phantom	£14.95

EUROMAX

Cobra Joystick	£11.95
Professional 9000	£14.95
Professional 9000 De Luxe	£22.95
Turbo Flyer	£12.95
Arcade	£15.95
Arcade Turbo	£19.95
Ultimate Rapidfire	£19.95
Ultimate Remote Control	£29.95
Racemaker	£26.95
Koala 7	£29.95
Challenger Remote Control	£27.95
Turbo Pedal Foot Controller	£22.95
IBM Analogue Joystick	£17.95
IBM PC Game Card	£18.95
IBM PC Joystick Adaptor	£14.95

KONIX

Speedking	£10.99
Speedking Autofire	£11.99
Predator	£12.99
Navigator	£14.99
Megablast	£6.99
IBM Game Card	£19.99
IBM Joystick and Card	£29.99
Multi-System Chair	£129.00

MICRO LEISURE

Starcursor	£18.99
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PORTHEOUS DEVELOPMENTS

Warp 1	£17.99
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POWERPLAY

Cruiser Black	£9.99
Cruiser Multi-Coloured	£9.99
Cruiser Clear Autofire	£12.99
Crystal Coloured Standard	£12.99
Crystal Coloured Autofire	£14.99
Switchable	£14.99
Crystal Clear Standard	£14.99
Crystal Turbo Clear Autofire	£16.99
Super Professional Std.	£14.99
Super Professional Auto	£16.99

SEGA

Sega Joystick	£14.95
Rapid Fire Accessory	£5.95

SINCLAIR

Magnum Light Gun	£29.95
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SPECTRAVIDEO

Quickshot I	£5.25
Quickshot II	£6.95
Quickshot II Turbo	£10.95
Flight Controller	£12.50
Wizmaster QS-118	£11.95

SUNCOM

Tac 2	£10.95
Tac 3	£11.99
Tac 5	£12.99
Tac 30	£13.95
Tac 50	£14.95
Starfighter	£8.99

WICO

Wico Bathandle	£19.99
Wico Ergostick	£19.99
Wico Redball	£19.99

CRUISER

Powerplay, £12.99 Black or Clear Autofire

Traditional, simple and brilliant design. Two large fire buttons inset into the rounded base and a ball-type handle of just the right shape and size. It's comfortable to use, extremely durable and with its rubberbush anchorage, very responsive.



to launch a successful remote control joystick freeing it from the dreaded cord. But due to the frenetic wagging the problem is not as easy to resolve as with TV or HIFI remote controls. Reaction time and consistency in receiving the transmitted signals have held up it's success so far.

More radical solutions have been thrown at the user. From the mercury switch operated tilt stick to the light-sensing stick, which requires your finger to interrupt light beams, to the experimental glove controller with it's incredible array of sensors to detect the tiniest motions,

tensions and skin humidity, the pressure is on to find improved solutions to transmit our actions and reactions faster and more accurate to the computer.

There is however a movement towards the more traditional arcade controllers such as the tracker ball, or it's simpler equivalent the joyball, a joystick in tracker ball clothing, the good old steering wheel, the handlebars, foot controllers, and probably soon, the helicopter yoke with it's incredibly dense accumulation of singlehanded controls. Riding on a second wave is the handheld light gun, which expands the range of player input to one of unadulterated hostility, visually more so than a simple round fire button would indicate. Pray the victims be only nasty aliens and not cute ducks or friendly soviets in todays move to Peristroika. Mechanical recoil adds now further realism to the nasty business of liquidisation.

Most controllers do not provide tactile feedback as you would expect in real life. Imagine a steering wheel which responded to the road surface and speed and,

would kick back if you hit the curb. Or the handle bars transmitting vibrations from road and engine. Who knows when tactile or motional feedback are going to be part of the home package. Hardware costs alone are holding back developments such as the complete arcade hot seat, which transports you into a complete world of make-believe by attacking all your senses. Vision, audio and motion could effect total simulation. The advent of the Konix Multi-System with it's electrically activated chair may be the first step in the direction to an evermore sophisticated game of entertainment. And what a great step it's turning out to be...



RACEMAKER

Euromax, £26.95

An example of the new wave of realistic controllers, the **RACEMAKER** is limited to 3D cockpit simulation games, specifically fighter pilot action. The twin han-

dles feature comfortable hand grips with fire buttons either side. Fighterlike action with rotation for lateral movement and push/pull for vertical pitch movement.

GRAPH

Need a break from the usual joystick wagging, alien exterminating and monster bashing? Have a go at a more artistic approach to life with your computer! Painting with screen pixels can be very rewarding and may extract skills you didn't think you possessed. Don't be disheartened by your paper-bound abilities in art making, screen designing is a totally different ballgame and requires only an artistic eye, not necessarily an artistic hand...

It's been a lengthy process, but computer art is gradually establishing itself as something to be taken seriously.

Maybe the reluctance to give computer artists credit for their skills at painting with light was a mixture of snobbishness, poor screen definition — and of course the fact that you can hardly hang a VDU over the mantelpiece. But thanks mainly to the sophisticated output on TV, people are now more receptive to the skills involved, and graphic artists are at last getting the recognition they deserve.

But you don't need to be a pro to get the most out of your computer's graphics capacity; art programs are among the first packages to appear for new home computers, and the casual doodler will usually find plenty of helpful drawing tools contained within such programs.

Can't draw a straight line to save your life? Why bother when the computer can work it out for you; the same applies to curves, circles and rectangles. These are simple building blocks, and depending on the price of your software and the capabilities of your computer, they can be augmented by much more complex drawing and painting aids.

But before moving into what computer art packages are capable of, let's take a look at how you can actually translate your ideas onto the screen.

There are several methods of interfacing humans and computers; via the keyboard, a joystick, mouse, lightpen, and graphic tablet. Keyboards are great for text, but near-worthless as a drawing tool. When a joystick is the only option

with which to control an art program, the results are better than nothing, but can still prove cumbersome and clumsy; as a paintbrush, the joystick is a good game control!

The upsurge in the 16-bit market, and the availability of home computers such as the Atari ST and Commodore Amiga means the mouse has found many friends.

Feedback from a mouse takes a little time to get used to, but it proves itself an ideal tool for controlling on-screen drawing; sensors inside the hand-held mouse detect movements as it's pushed on its roller-ball over the desk surface, and translate them to onscreen cursor coordinates. Mice are ergonomically

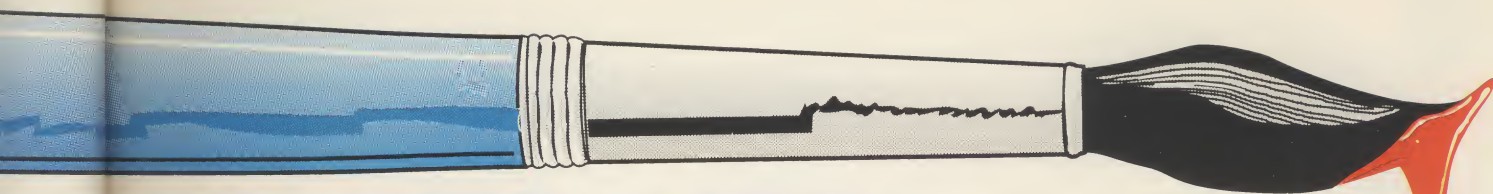
The 'big daddy' of them all, Electronic Arts' Deluxe Paint III is the most popular and acclaimed pixelmover in the business. Not happy with being the most user-friendly and versatile package for static screen design, it also boasts the easiest to use animation routines for budding picture animators. (Page 40)



WORKS

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PHICS

designed for comfort, and feature control buttons on their topside.

The lightpen, like the mouse, connects to the computer and, provided you have the software, enables you to point the pen a few centimetres from the screen surface and control cursor actions that way. A sensor in the eye of the pen gives the computer the information it needs to pinpoint its location, and the cursor is then drawn on screen. Accuracy can be questionable for artistic work, but lightpens are fine for less-demanding onscreen work.

Graphic tablets are the premier drawing tool, and once connected to your machine allow you to use a pen-like stylus to 'draw' on the tablet (not on the screen, as the lightpen). This is the closest you can get to using pen and ink, pencil or paint, though you do pay a high price for the privilege.

Graphic programs themselves fall into a number of categories. The most common is the standard art toolkit which lets you sketch and colour, using brushes of varying sizes and shapes.

A more specialist package allows you to construct a realistic 3D world on your computer's screen by using ray tracing calculations. The concept of these is to construct an image based on parameters the user has input; these will normally include various surface textures and light sources.

The computer then does an intense amount of lengthy number crunching to calculate how the rays of light interact with objects in the scene before rendering reflections, refractions and shadows to simulate an almost photographic scene.

The computer can take many hours to complete its calculations, and afterwards you may feel divorced from the actual end product and so lose the creative spark which is important to all artists. These programs tend also to demand geometric shapes as their source, which is also an alienating factor.

Finally there is the true 3D modelling design work (ie draughtsmanship) rather than for artistic pleasure, but they can form a useful part of an artist's repertoire when used in animated sequences.

Clearly the art package for any particular micro will be a compromise between the machine's graphic resolution and capabilities, and the cost of the software. If you take art seriously you should be prepared to pay for the best; in price, it usually ranks below serious business software, but is much more expensive than the average entertainment program.

ANIMATION

Closely linked with graphics is computer animation. Remember — once an image is held in the computer's memory, it doesn't have to sit still!

Some software actually combines an art program with an animator, but usually animation packages rely on already completed artwork to be used, so they will prove an additional expense.

You might consider this aspect of computer art worthwhile, as it opens the way to a greater degree of creativity and satisfaction. Computer animation is a growth industry; it's still something of a



'A more specialist package allows you to construct a realistic 3D world on your computer's screen by using ray tracing calculations.'

SHOP

CCEG

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'But if you intend animating a character, you have to draw each stage of movement separately so they can be played back to simulate movement.'

This is the way Walt Disney started over half a century ago, and unfortunately things haven't changed much!

fledgeling art and people are still happy simply to experiment.

Because powerful data manipulation is required, computers running animation software require large memory and fast processors to achieve professional results.

Animation software has been constantly evolving, and currently both the top end and the less ambitious programs have capabilities which would have been thought impossible even two years ago. On the fun side, cartoon-style animations are popular, and in this area much has been done by programmers to take a difficult concept and hit the right level of sophistication while still making learning easy. The results themselves give pleasure twice — in the creation and the execution.

At the higher end, animation programs strive for the kind of effects familiar on TV, and are generally aimed at the professional user — with a professional price tag to match.

Recently, sound has become a major attraction for the more ambitious programs, allowing moving onscreen pictures to be synchronised with sound data loaded into the computer. Again this requires plenty of free RAM, but is great fun for fun 'films'.

But while computers are ideal tools for displaying and manipulating images, there's no escaping the work entailed in getting the artwork into the computer in the first place. A short burst of animation can take many hours of detailed work to create.

However, to save time, there are such things as graphic backgrounds and pre-drawn artwork available on commercial disks; you still have to be prepared, though, for some hard work in creating the basis for your presentation. If all you intend doing is moving a static image across the scene, with no intrinsic movement (for example a plane in flight — bits of it don't move), then most programs find this an easy task, and you only have to draw the one image.

But if you intend animating a character, you have to draw each stage of movement separately so they can be played back to simulate movement.

This is the way Walt Disney started over half a century ago, and unfortunately things haven't changed much!

But if you choose a program with what's called metamorphic capabilities, you can achieve some fluid geometric animation with little fuss. This kind of software is different from the bitmapped kind (which works with actual screen

artwork) in that it uses polygons; generally you can stretch or spin your basic shape from one key frame to another, then let the program work out the in-betweens over a set number of frames.

Using polygons produces smooth two-dimensional motion, but of course lacks the detail you might want — they are comparable to silhouettes really, but for all that can be put to some inventive use.

Some animation programs also allow special effects to be generated, allowing independent manipulation of the moving image (for instance making it explode outwards as it's moving along). But the complexity of such software tends to be daunting to the newcomer and best approached with the benefit of experience.

Perhaps the first obstacle to overcome with computer graphics is their fleeting nature. Once the plug has been pulled on the computer, they fade and die. They can be stored on disk or tape for later retrieval, photographed or printed, but the results are never the same as the crisp image from the VDU. If you have the right equipment, you might prefer to put your artwork and animations onto videotape, but here again a loss in quality will be evident.

Computer graphics really are art for art's sake for most of us — the end product is what really matters. And with today's powerful machines and their graphic capabilities, this is limited only by your imagination.

Fed up with the fact that your screen creation is forever screenbound? Two options open to you. Convert your screen images to photographic slides with the Polaroid Palette interface and Liquid Light Imprint, which allows you to take controlled exposures of your favourite IFF files (if you baulk at the hefty price of over £1700 you can try doing the same thing with your camera and tripod), or you can go for colour hard copies with one of the existing colour ink jet printers. Choose between the best print-driver supported models, the Integrex 132, the HP Paintjet and the Xerox 4020. The Xerox 4020 provides the most vibrant and dense colour prints, the HP Paintjet the highest resolution (180 dots per inch). Don't expect perfect colour reproduction however. Unlike repro print, the ink jet printers do not use the variable dotsize method to create shades (yet!). Instead, they use the dithering technique of mixing base colour dots to form tints. The software driver must therefore create and match the screen tints and this is not always so successful. Dithering ruins the print resolution, as it requires several dots to form a tint. Judge the quality of a Xerox 4020 print on the right. The variation from the original screen pic may not always necessarily be detrimental. Experiment!



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There is a tool for every job. Obviously, the Amiga is the favourite machine for graphics work, so a look at the Amiga's graphics utilities and peripherals will illustrate the multiple choice but also the massive investment you could end up with. Linking up home video equipment to the Amiga can make a serious dent in your home budget, but provides also great rewards...

VIDEO EFFECTS

Deluxe Productions	Electronic Arts	Amiga	£139.95	presentation & animated titling
Deluxe Video 1.2	Electronic Arts	Amiga	£69.95	animation & titling
TV*Show	Zuma Group	Amiga	£69.95	video special effects
Video Generic Master	Kimatek 1988	Amiga	£69.95	
AniMagic	Aegis Developments	Amiga	£69.95	animation & special effects
Video Effects	Innovision Tech.	Amiga	£149.95	special effects generator, 3D effect

VIDEO TITLE GENERATOR

Aegis Video Titler	Aegis Developments	Amiga	£109.95	video titling
Pro Video Plus	JDK Images	Amiga	£249.95	prof. video character generator
TV*Text	Zuma Group	Amiga	£69.95	video character generator

GRAPHICS

Deluxe Paint II	Electronic Arts	Amiga	£49.99	paint program
Deluxe Photo Lab	Electronic Arts	Amiga	£69.95	poster generator
Deluxe Print II	Electronic Arts	Amiga	£49.95	leaflet creator
DigiPaint III	New Tek	Amiga	£59.95	HAM paint package
PhotonPaint II	MicroIllusions	Amiga	£69.95	HAM paint package
Aegis Impact	Aegis Development	Amiga	£63.25	business presentation graphics

CAD

Aegis Draw 2000	Aegis Development	Amiga	£199.95	2D CAD package
Dynamic-CAD V2.3	Soft Circuits Inc.	Amiga	£495.00	2D CAD package
Intro CAD	Progressive Peripherals	Amiga	£59.95	entry level CAD
X-CAD Designer	CAD Vision	Amiga	£99.95	entry level CAD
X-CAD Professional	CAD Vision	Amiga	£499.00	professional 2D CAD (1.5Mb)

RAYTRACE

Sculpt 3D	Byte by Byte	Amiga	£85.00	3D ray tracing
Sculpt 4D	Byte by Byte	Amiga	£399.95	professional 3D ray tracing

ANIMATION

Animate 3D	Byte by Byte	Amiga	£125.00	animates Sculpt 3D ray-traced files
Aegis Animator/Images	Aegis Development	Amiga	£103.50	polymorphic animation
Fantavision	Broderbund	Amiga	£39.95	2D movie creation with sound
Movie Setter	Gold Disk	Amiga	£69.95	movie creator
The Director	Right Answers Group	Amiga	£57.44	sound and animation
Videoscape 3D V2.0	Aegis Development	Amiga	£143.75	3D animation package
Photon Video	MicroIllusions	Amiga	£119.95	professional animation program
Lights, Camera, Action!	Aegis Development	Amiga	£57.50	animation program

GRAPHICS/ANIMATION COMBOS

Deluxe Paint III	Electronic Arts	Amiga	£79.99	graphics & animation package
Sculpt-Animate 4D Junior anim.	Byte by Byte	Amiga	£119.95	introductory 3D modeller &
Sculpt-Animate 4D Professional	Byte by Byte	Amiga	£368.00	prof. 3D modeller & animation
Turbo Silver 3D	Impulse	Amiga	£139.95	modelling, rendering & anima-
Design 3D	Gold Disk	Amiga	£64.35	3D modelling & rendering
Comic Setter	Gold Disk	Amiga	£69.95	comics creator

DIGITISERS/SCREEN GRABBERS

Grabblt	Discovery Software	Amiga	£29.95	screen capture
Digi View Gold V3.0 wheel	NewTek	Amiga	£113.00	Image capture with colour filter-
DigiPic	JCL	Amiga	£249.95	realtime mono frame grabber



SuperPic lock	JCL	Amiga	£539.35	Colour frame grabber with gen-
VD3 B&W Frame Grabber	Burocare	Amiga	£632.50	realtime mono for A500
VD3+ Col. Frame Grabber	Burocare	Amiga	£914.25	realtime colour
VD3 Colour Upgrade colour	Burocare	Amiga	£339.25	conversion kit from mono to
Professional Video Adaptor A2000	CBM	Amiga	£836.05	genlock & frame grabber for
Baxal V3403 B&W Video Camera	Baxal		£228.85	B&W 500+line digitising camera
Adjustable Video Camera Stand	RCA		£17.25	digitising camera stand
Digidroid View	New Tek	Amiga	£59.95	motorised filterwheel for Digi

GENLOCK

Minigen	Applied Systems	Amiga	£113.85	composite genlock
Rendale 8802 Genlock	Rendale	Amiga	£299.99	RGB genlock for A500
Rendale 8806 Genlock	Rendale	Amiga	£862.50	studio quality RGB genlock
Amiga A2300 Genlock Digitiser	CBM	Amiga	£286.35	RGB genlock

COLOUR PRINTERS/PLOTTERS

Canon PJ1080A Ink Jet Printer	Canon		£573.85	80col/37cps/4col/friction
Xerox 4020 Ink Jet Printer	Xerox		£1437.50	80cps/8col
Xerox 4020 Cut Sheet Feeder	Xerox		£253.00	
Xerox 4020 RS232 Interface Kit	Xerox		£113.85	
Xerox 4020 Roll Holder	Xerox		£28.75	
Xerox 4020 Rainbow Ink Pack	Xerox		£18.33	
Xerox 4020 Black/Yellow/Cyan/Magenta Ink			£9.17	
Xerox 4020 Maintenance Fluid	Xerox		£18.33	
Xerox 4020 A4 Sheets (500)	Xerox		£28.97	
Xerox 4020 Paper Roll (210mmx50m)	Xerox		£19.98	
Xerox 4020 OHP Film (215mmx279mm)	Xerox		£55.71	
Graphtec MP3200 Plotter	Graphtec Corp.		£1206.35	8 col flatbed plotter

GRAPHICS/VIDEO HARDWARE

Polaroid Palette	Polaroid	Amiga	£1719.25	screen to slide generator
Polaroid Palette Plus	Polaroid	Amiga	£2472.50	
Flicker Master	T.S.R. Hutchinson Co.	Amiga	£12.95	reduces interlace flicker
Flicker Fixer				
PAL Composite Video Card	CBM		£113.85	for A2000

MONITORS

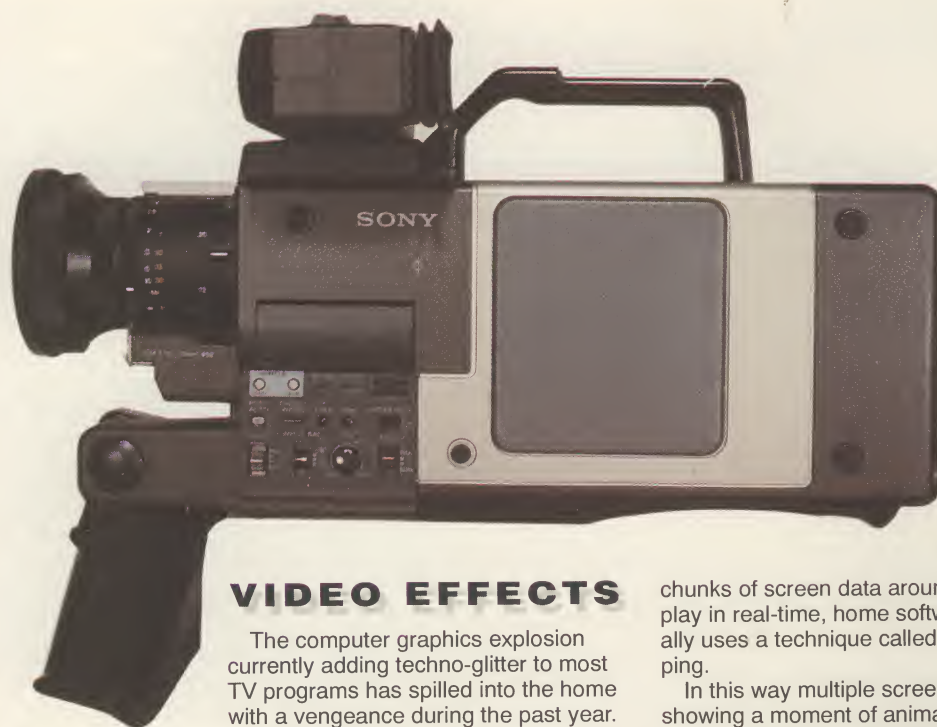
Amiga 1900M 12" Mono Monitor	CBM		£99.99	green screen
Amiga 1084S 14" Colour Monitor	CBM		£299.99	stereo, medium resolution
Philips CM8333 14" Col. Monitor	Philips		£314.95	stereo, medium resolution
Quadram MS1420/22 14" Colour Monitor	Quadram		£499.99	hires multiscan
Commodore A2024 Mono Monitor	CBM		£764.75	hires mono monitor for A2000

MOUSE DEVICES

Amiga Mouse	CBM		£34.99	standard 2 button mouse
Mouse Mat	Actionsoft		£7.55	foam with white C= logo on red
Marconi RB2 PC-9 Trackball	Marconi		£59.95	3 button trackball

GRAPHICS TABLETS

Easyl Drawing A4 Tablet	Easyl		£299.00	for A500/2000, pressure sensi-
Cherry A3 Graphics Tablet pad	Cherry		£632.50	inc. puck & software, magnetic



'You don't necessarily need a top notch camera such as this Sony CCDV100 for your computer generated video effects. Thankfully, camcorders have come a long way and even the most cost effective cameras will provide you with a perfectly acceptable picture quality. Digitising work however puts more demands on the video source, as computer screen resolution demands higher quality than a normal PAL video camera can provide. Best options is to go for Super VHS camcorders or monochrome video cameras and colour filter wheels.'

VIDEO EFFECTS

The computer graphics explosion currently adding techno-glitter to most TV programs has spilled into the home with a vengeance during the past year.

At a fraction of the cost, home computer users can mimic some of the dazzling effects created by the pros — and at the same time score a big dose of self-satisfaction. Think of almost any TV programme — from the computer-generated animated graphics of the humble weather report to Channel 4's startling Network 7 series — and you begin to see the debt they owe to pixel-power.

So why are computer effects so widespread? Two main reasons — impact, and the creation of an illusion of confidence by employing 'mysterious' high-tech wizardry. But there's no great mystery to video effects. Provided you have the software, the computer to run it on, and the flair, it is within everyone's reach.

However, not all computers have software to turn them into an effects console; generally the 16-bit home computers have the largest potential due to their processor's high speed, which lessens the heavy processing overheads that graphics entail. Memory is also a major factor, with a minimum 1 megabyte of RAM often demanded by programs — so you can expect a hefty price tag in terms of hardware outlay.

But the rewards are great too.

Home computer effects packages have generally adopted a simple but effective technique for emulating the dedicated professional video generators. Instead of trying to move great

chunks of screen data around the display in real-time, home software generally uses a technique called page-flipping.

In this way multiple screens, each showing a moment of animation, can be drawn at the computer's leisure (sometimes over several hours) and then flipped through to simulate movement. Just like they do in the cartoon studios.

This does lead to an often laborious process as the effects program works out the position of objects which have moved in position from one screen to the next, and then saves the newly-generated graphic screen to disk.

But the trade-off is some super-smooth movements when played back on screen at around 30 frames per second.

The kind of effects possible are wide-ranging, and clearly while not on a par with ones generated on hugely expensive mainframe computers, do technically amazing gymnastics.

Scrolling credits are the easiest form of video presentation, and often something which can be duplicated using a slideshow utility if one is available in the public domain for your micro without the need to buy a specialist video program.

The more complex effects currently state-of-the-art on perhaps the most popular home effects computer, the Commodore Amiga, include confetti fills, page turn, shatter and recede, and paint dribble. Designing screens for all these gee-whiz effects on the computer is satisfying, and lets your creative juices flow. But what then? Obviously

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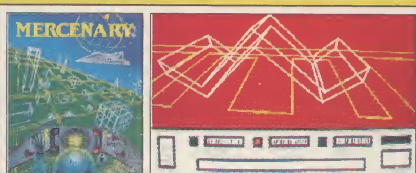
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Do you already own a computer
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Another possible source for digitising is the video cassette recorder. Most households are already equipped with the VCR, invaluable if you don't want to miss an episode of 'Neighbours' ... If you don't have a fast frame grabber (which 'grabs' a single video frame within 1/25th of a second) you will need a VCR with perfect still frame facility, which guar-

you need to have an aim for their use. And one of the main reasons people spend their time and energy on creating effects is to incorporate them in their own video productions. This new market has been brought about due to the availability of video cameras, which can be hired from TV rental stores almost anywhere; and budget (sub-£800 that is) prices mean camcorders have found a place in many homes.

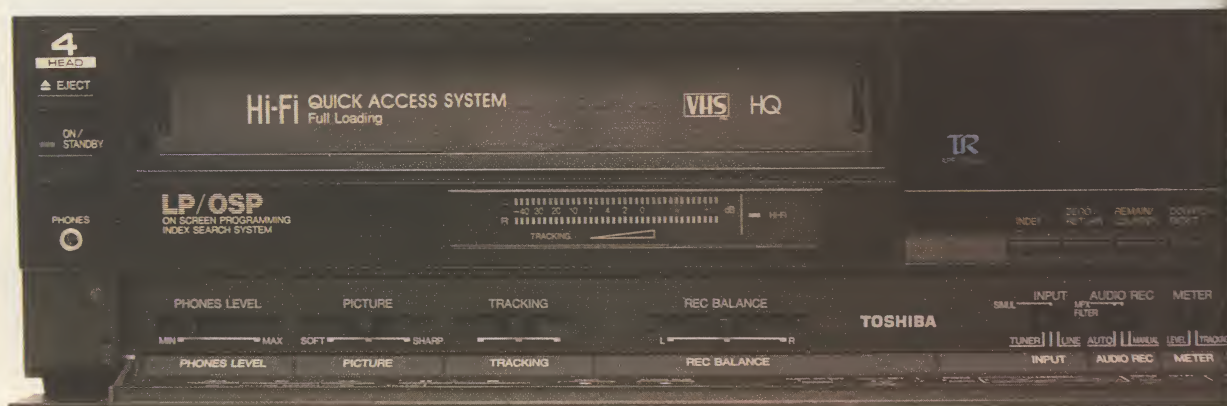
So now those shots of your holiday can be given an added dimension — the kind that people expect, and which really grabs their attention. However, money rears its head again, because to incorporate your computer-generated graphic effects and movies on to the same videotape requires what is called a genlock device.

This usually small microchip add-on synchronises the signal from your computer and camera, sending out a video

choice, or whirl and spin credits at the end of a film, offsets this. Boosting one's ego is not a minor consideration either!

It's possible now to buy combined genlocks with video digitisers, though the latter are commonplace on their own and of considerable use in creating the basis for an effect. Digitisers receive the signal from a video source and convert it into graphic data which your computer can understand. You need your own video source, perhaps a VCR or camera, but the digitiser's software can be extremely sophisticated.

The more inexpensive digitisers work only in black and white, but allow camera users to create full colour computer images by another simple dodge — shooting the same scene through red, blue and green filters, then combining the resulting images and their hue values to make a real colour image.



antees noiseless still pictures. Again, expect limited resolution, as normal VHS recorders will only provide 200 lines. Slow digitisers such as the affordable Digiview reproduce better images than fast frame grabbers, as they average multiple readings to delete spurious noise. They do however require a static source.

signal to combine the two. Simply speaking, anything on your computer screen which is not in the background colour will appear over the camera's image and be available to be recorded onto your VCR. All you have to do is connect your video camera's out signal into the genlock's In connector, plug the genlock into your computer's relevant port, and feed the outcoming video signal into your video recorder.

In practice you can expect a slight degradation of picture quality on the resulting tape, but the freedom to include place-name captions from time to time in the colour and font of your

This is similar to printing techniques where one colour is overlayed on another, and is an elegant solution which keeps the cost of the equipment down. More expensive full-colour digitisers are also available.

Once an image has been captured — a frame 'grabbed' to use the jargon — then you can then manipulate it with your favourite art package, and begin to plan some video effects around it.

So while it is not possible, for example's sake, to use a video camera shot of a map as the source for a real-time effect (other than as a background that is), the digitised image can be used

instead, to be flung around and spun to your heart's content. You have to be aware, though, that digitised images are often coarse-grained, and unless you invest in the very best digitisers, cannot be considered to give truly photographic results.

But what good is all this video glitz? Good enough, maybe, to earn you cash in your spare time.

On the first point, most towns have some home-grown video company offering to film weddings and celebrations, and there might be scope for providing them with special logos or title effects. You could check this out by asking to see a demo of their work; if you can say 'I can do better than that' then the best way to introduce yourself and your talent is to create a dummy title and send it back. But don't forget to add something like 'Test' on the screen image so your work can't be ripped off!

Let's not forget business presentations either. More and more, companies are recognising the potential offered by visual training aids and staff presentations. And if these can be done in-house at a fraction the cost of hiring a specialist firm, then their potential — and maybe yours — will be quickly realised.

EPILOGUE

The boom in 'home-grown' video effects has been brought about by people's exposure to TV; swamped with images tumbling and spinning onto the screen, they expect it as a norm. And it really is available to home computer users now. Don't expect, though, to get the same high quality you see on TV. For a start the definition of computer graphics is not as high — though watching portions of *The Chart Show* or *Screen Test* will give you an idea of what an affordable home micro — the Amiga — can do. Nothing shoddy about those. The software prices are in the mid to high range, and on top of that you will certainly have to invest in a genlock for any useful applications. But it opens the door to a world of creativity which you can share everytime anyone watches one of your videos.

It's quite a moving feeling really...

A typical low-cost digitising work station. The camera is a monochrome close circuit Panasonic WV1410, which in combination with the Digidroid motorised filterwheel provides an excellent source for Newtek's Digiview digitiser. The stand originates from an unused Durst photographic enlarger and has been accordingly adapted. Missing on this picture is the light source, which needs to be halogen (expensive) or fluorescent tube if perfect colour rendition is required. Special digitising stands with lighting are available if you don't want to adapt existing equipment.



J A



S E S S

If you can whistle a tune, you're likely to have some musical talent. Maybe you don't have the necessary finger dexterity, but thanks to your trusted home computer that might not matter all that much. David Wiltshire and John Parry delve into the subject of computer-moderated music...

It is an interesting thought that many of the tiny little keyboards you see in the high street chain stores owe their sales to smart software programming. Witness any Saturday afternoon with hordes of kids pressing the keys of these instruments. Sure enough one of them will drag a parent over and by pressing a few keys produce something which is vaguely passable with sound, drums bass and chords all pumping away. Parent tries it and is subsequently impressed with the musical utterings coming from the tiny speakers thanks to said parent's stubby fingers plonked on keys at random. Result, one sale, thanks to the software housed in the keyboard which is programmed to interpret the fingers on the keys according to various musical peripherals.

The computing capacity of any micro is infinitely greater than any of the keyboards available. All that's required is the software to put it into musical gear. You don't need to be an egghead to work it neither do you need to be the offspring of a latterday Mozart to get a great deal of fun and pleasure from the musical side of the computer. What you do need, though, is some information on the soft- and hardware available, plus information on the functions which make up the increasing music side of computers.

The first decision is really up to you and your budget. You can either have

the computer as a stand-alone instrument or you can use it as a controller of other dedicated musical instruments. The latter of course is the least cost-effective way, so let's first take a look at computers as they roll off the production line.

CREATING SOUNDS: HOW THEY SHAPE UP

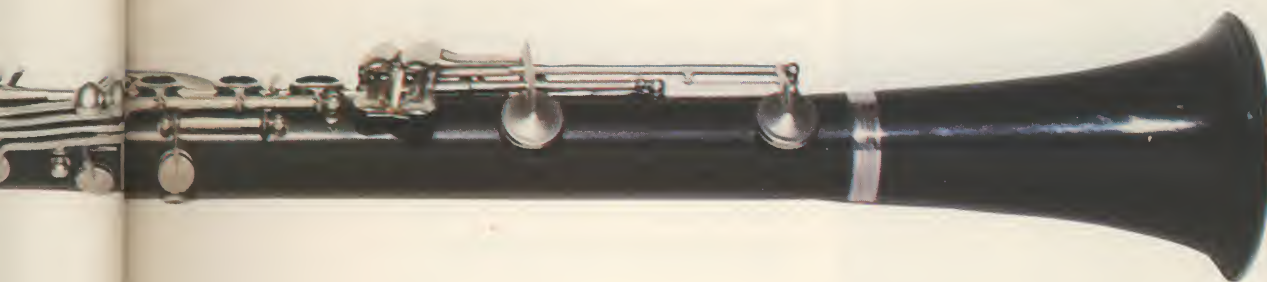
Many computers still use an industry standard chip, or a clone, with the serial number AY 8912. Capable of generating three channels of sound, any one of which can be turned into noise at will, its main drawback is that despite its longevity and the numerous games which have prodded and poked it, its sound remains very distinct. It is limited as to the actual quality of tone it produces: if you imagine any arcade-type game, you'll know what we mean.

The computers which use this chip are: Atari ST, BBC B and Master, 128 Spectrum, PC and clones, plus a host of other esoteric machines.

The first commercial machine to address the sound area directly was the Commodore 64 which used a special four-channel chip known as SID. (By the way, the number of channels equals the number of notes it can play simultaneously.)

There are two machines which use custom-designed sound chips. The

AM



S I O N

Amiga has a four-channel stereo chip generating a very high quality sound and the Archimedes has an even more superior eight-channel stereo chip.

There are programs around for all the computers mentioned which allow you to create and shape sounds. Sometimes they are a module of a larger program but usually they are separate and quite inexpensive programs. The sound can be shaped and in the case of the Amiga and Archimedes the tones can be drastically changed. Programs for the ST, Amiga and PC can be found in most public domain libraries, which is, of course, a nice and inexpensive way of getting yourself into music and sound.

The AY 8912 chip generates a basic tone which you're stuck with. You can only filter this tone a little bit and do a few clever things to it with the sound shape (commonly known as the sound 'envelope'). The ST and PC public domain libraries have several programs which let you play around with this.

It would be fair to say that the Amiga and Archimedes are well ahead of the rest in terms of sound generation. However it would also be fair to say that their potential has not been developed. Nearly all the sound creating programs we have seen for them are actually sample players; in other words the sound of real instruments captured digitally. These are then used by the software as a basis for creating other

sounds by manipulating the sound's shape and tone. Further software development is definitely needed on the synthesis front here.

We mentioned sampling and before we venture any further an explanation is due: more and more software uses sampling including many games now available.

WHAT IS SAMPLING

Sound sampling is a technique whereby a real sound is converted into digital computer language and then stored in the memory. A device listens to the sound and slices it up many thousand times a second. Each of these slices is converted to a digital 'photograph' and filed away. To recall the sound all you need do is pick up all the slices of sound in the correct order and reverse the process by converting them back to an audible form.

The audible form which works conventional amplifiers, headphones etc., is a constantly altering electrical current called an analog form as opposed to the digital one. Sound chips, like CD players, have to convert from digital to analog all the time as this is the way they work internally. The fact that they do has been used by many programs. There are many public domain sample-playing programs which play back either popular tunes or excerpts from

"It would be fair to say that the Amiga and Archimedes are well ahead of the rest in terms of sound generation."

CCEG

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"The most basic form of audio sequencer was created when Thomas Edison shouted 'Mary had a little lamb'"

cult films and TV programmes such as *Star Trek* or *Thunderbirds*.

As we mentioned before, many games use sampled effects or tunes. There is no computer which can sample sound without additional hardware. However, sampling does carry a few penalties. Since our ears require a rate of about 5,000 samples a second to be only just about fooled (5KHz) and something like 10-20 KHz to be successfully fooled, the memory space available gets used up very quickly. This is despite using a sampling language in eight bits which is far less memory intensive than dedicated samplers which are usually 12- or 16-bit, giving them a much more accurate sound reproduction. Another problem in sound sampling is that you need to have some very clean — quiet — sound filters, not to mention the intricate routines which smooth the passage from one slice of sound to another.

This goes some way to explaining why the ST and PC, although not bad at playing back samples thanks to large memories, are beaten by the Amiga and Archimedes which have their smarter and quieter chips.

Having created a few sounds you now want to play a few jolly tunes. If your ability to play is not much better than a one-fingered version of 'She'll be coming round the mountain', perhaps you might like to warm up with a few public domain games: they're about and do things like playing tunes and asking you to recognise them. It would also be fair to point out that even a keyboard expert would find playing

from the QWERTY keys pretty impossible — this is the biggest limitation to playing tunes directly from the keyboard. No, what is needed is some way of storing tunes etc., maybe as you played them or maybe you could put the notes in one by one. In order to do this you need a sequencing piece of software. Time for more instant erudition on the subject of sequencers.

SEQUENCERS

The most basic form of audio sequencer was created when Thomas Edison shouted 'Mary had a little lamb' at his wax cylinder phonograph in 1878, and when it was rotated back it reproduced his voice. In other words it played things back in sequence. Since everything you do on a computer can be memorised digitally (this is the main principle of a computer after all!), it doesn't require much imagination to work out that a sequence of notes can be put into the computer's memory much in the manner of a word processor.

If the sequencer remembers things as you play them it is known as a 'real time sequencer'. If it waits for you to put each note in individually it is a 'step time sequencer'. The immediate advantage is that you can listen to your first witterings and add either a second part below it or tag an extra piece on. Our sequencer should be able to play them back as required.

On the subject of visual display, we reach another crunch point. Can you read music notation? If so notes can be either played in or positioned on the staff. If you can't a sort of graphic notation is needed — a system of blobs and a graph background to get you to follow what's happening. Usually step time sequencers use traditional notation. As you will see, the up-market programs do both, and many other tricks besides.

One final point to be made about internally generated sounds: played back through the speakers in the monitor they sound about as good as listening to a CD play back via a bean can — monitor speakers being notoriously cheap and nasty. It's usually possible by some means or other to route the audio signal into a stereo system. The Archimedes and Amiga provide sockets on the back especially for this purpose.

Until a computer comes out with

Dr T's MIDI Recording Studio

Use cursor keys or arrows at left of screen to scroll.

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some really smart voice chips on board and the software to match, we in the home market are going to have to look elsewhere if we want to step up a few rungs on the ladder and work with better sounds. In other words you need an external source of sound which of course means shelling out for a keyboard or synth of some description. In turn this means learning a little bit about the method of communication with them. You've guessed right — it's time to burn some midnight oil and swot up on MIDI.

MIDI

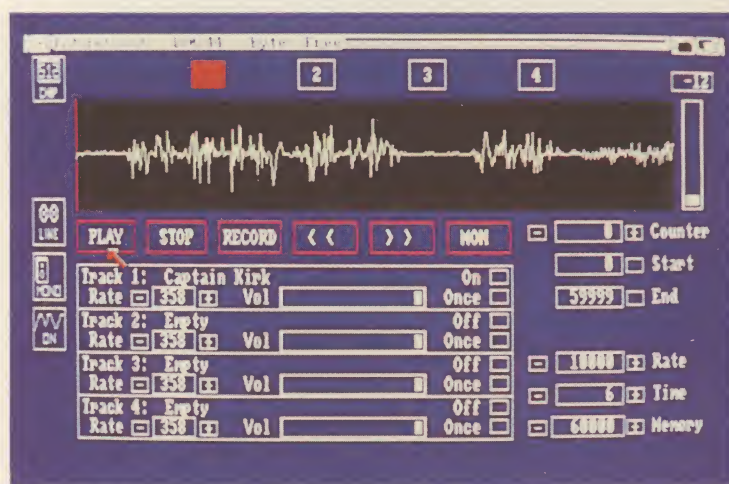
An acronym for Musical Instrument Digital Interface, MIDI is an agreed international standard whereby information can be passed from one musical instrument to another, and it was first launched in 1983.

Here's a quick example: synthesizer A is connected to synthesizer B. They are of different makes. Any note you play on synth A is also played on synth B, the net result being a combination of the two sounds.

Notes are only one level of communication, though. If you switch from sound 1 on synth A to sound 5, synth B also jumps to sound 5 regardless of what those sounds actually are. (Even if the sounds are not numbered on the panel of the instrument they will have been allotted one internally).

Moreover, any pitchbending on synth A also bends the sounds on synth B — provided the sounds are programmed to respond to this. To sum up — all the controls including notes and the force with which you hit the keys, in short anything which is common to both instruments, can be communicated one to another. Each instrument will have two — possibly three — MIDI sockets: In, Out, and Thru. To connect them you settle on which instrument is master, come Out of there and In to the second instrument. If you have more than two instruments you can 'daisy chain' them together by coming from the Thru socket on synth 2 and then In to the next instrument. Which, as we said, is the basic principle.

However, there's more depth to this communication system. First of all it works rather like cable TV in which you tune in to channels. There are 16 channels on which MIDI transmits common information and each instrument needs to be on the same channel in order that they sound together. MIDI sequencers



are capable of controlling all 16 channels, sending separate information out on each one, this being on control of 16 separate instruments if necessary.

The music industry has therefore developed sound expanders, sometimes called tone modules, which are in effect keyboardless synthesizers; you don't need a keyboard on your second or third instrument, you already have one on your master keyboard. To save more space many of the tone modules are 'multi-timbral' — which is, they can play several sounds simultaneously all responding to different channels. Smart stuff — as it means the cost of adding to your system is less than you may have first thought. It also means that the concept of built-in obsolescence is much further away. Only if the actual sounds go out of fashion is the instrument a bit jaded.

Dedicated drum machines can also be linked to the MIDI sequencer as MIDI sends a series of regular pulses — timing clocks — which keep the drum machine in time with the controlling computer, provided that the drum machine is told to listen to the MIDI clock and ignore its own. The actual sound of the drums themselves can be treated as notes and played directly from the sequencer.

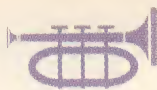
Finally, at the innermost level, special information concerning the voice-creating data can be transmitted. This is only pertinent to machines of the same make and model and is called 'exclusive' information to be ignored by any instrument not on the same status level. For our computer, though, this is a major bonus as it means this information can be interpreted by software and either filed away as a sound library —

Applied Visions' Future Sound sampler

"You've guessed right — it's time to burn some midnight oil and swot up on MIDI."

CCEG

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"All the talk about the wonderful world of MIDI is well and good, but how do you get your machine to talk to the musical device?"

thus providing a very useful back-up to the sound in the synth — or it can be displayed on screen as a voicing program. Creating sounds on synths is notoriously difficult as the display possibilities are very limited. As synths get more complex in their method of generating sound, so the need for more sophisticated ways of assisting the creation of voices are required.

MIDI, MUSIC SOFTWARE AND THE HOME COMPUTER — HOW THEY COMPARE

All the talk about the wonderful world of MIDI is well and good, but how do you get your machine to talk to the musical device? Answer: you need an interface — to be absolutely specific a MIDI interface. How computers shape up on this score (no pun intended) is very different.

Ideally all interfaces should be equal, which is to say if you have one make of interface on your computer, it shouldn't matter whose software you run it on, it should still function perfectly. Not quite true in all cases, however. This factor is very important, particularly if you are thinking about buying a computer with an eye (or ear) to creating and making music. They break down like this:

ATARI ST

No problems whatsoever. The interface is built-in guaranteeing compatibility — a major factor in giving the ST probably the largest selection of music software of any computer available in the UK. As previously stated, the internal voice chip's a bit naff and it's not the best sampling computer going, but still supports more software than any other including the real professional stuff.

AMIGA

No interface built-in, but the good news is that interfaces only cost about £25, and thanks to Commodore's foresight they're all universally compatible. The only drawback is that they sit in the serial port which might give rise to a few problems if you want to run other programs using this port — the Amiga can have programs sitting on the back burner ready to be brought forward. It holds samples (four) internally and plays them back from most sequencing packages. Not enough software has been developed specifically for it yet bar *Music X* and it suffers with having to wait for programs crossed over from other systems.

PC

Big problems with the interfaces here. We rely mainly on US imports of programs and hardware, and the programs are not really up to date because there hasn't really been enough serious development for the PC recently. The interfaces are not all compatible for all software although there is an interface marketed in the UK by Program Shops Ltd. (Tel. 01 316 7777) for £99.99 which is compatible with most. Generally we have found that the programs' architecture is a little elderly nowadays. The internal sound chip is not so good, although there are probably more fun music programs available for it than any other computer.

ARCHIMEDES

The new A3000 now has the MIDI interface built-in, so the boys at Acorn are obviously pushing to get into this market — previous versions of the Archimedes did not and you had to buy extra back plates and 'podules' which set you back a considerable amount. At present the software base is small and limited to only a few software houses, but once the machine gets a place in the market this should expand. The internal chip is excellent and the speed of the machine ensures samples are played back very well and manipulated very fast indeed. The initial cost may be a minus factor unless you are using it for other applications.

SPECTRUM 128

Same boring internal chip. Sadly the internal architecture of the machine meant that most programs already in existence for the 48K Spectrum would not upgrade and use the full 128K memory. MIDI is fitted but in such an afterthought way that it really doesn't bear thinking about. Our advice here is to pick up an old 48K and get in touch with the Spectrum Music Machine user group, who have plenty of information about the soft- and hardware you can use. This would be the ultimate low-budget approach.

There are two new computers which sport enhanced sound. The **SAM Coupe** — which in many respects is a souped-up Spectrum — has a six-channel sound chip, and the new **Atari STE** also has a six-channel sound chip. At the time of going to press we have not had review copies of these machines to test.

Obviously the best bet would be a program which encompasses all the things we've mentioned so far: a sequencer which not only plays exter-



nal MIDI devices but also plays the internal sound chip. It might also allow you to file your synth voices away and set up the sounds on your synth as well. The answer to these prayers is in fact available at a shade under £200, but only for the Amiga. *Music-X* is an all-encompassing program which does some pretty smart sequencing and arranging, sets up the synths, saves in various compatible formats, and also acts as a very smart MIDI interpreter.

Editing is either from the data stream or from the very visual and colourful graphic editor, taking full advantage of the Amiga's multi-tasking traits.

MORE ON SEQUENCING

Having explained earlier what sequencing means, let's look at a few of the features which you should expect from a sequencing package, regardless of the computer running it. Remember it is you who will be using it and ideally you will probably need something simple to use but with maybe a few possibilities which you can gen up on as you get into the program.

Since we're talking about MIDI we need something capable of running all 16 channels simultaneously. In the case of the computer with the possibility of playing the internal sound chip; this should obviously be available as an option. A good main screen should show you what tracks/channels are playing at any one time, with a bar counter telling you how far into the piece of music you are. To find any place in the piece you should have the equivalent of fast forward and reverse found on a cassette recorder. A refinement of this is either an ultra-fast wind or a way of jumping to a preset location.

Just like a word processor, the ability to cut, paste, copy and move any defined chunk of music is also vital. Music should be copyable from one section to another without tears or tantrums. It also goes without saying that it should save your effort either track by track or as a whole song, and any important functions like delete and copy should be protected by additional prompt commands. Tracks of course should be switchable on and off and a Solo feature which mutes all other tracks is a real time-saver.

Entry of the notes, either from the QWERTY keyboard or a MIDI keyboard, should be easy to do and, the

length which you can perform should not be preset — it is really frustrating to find yourself cut off in mid-inspiration.

Editing: This is a large can of worms. First of all, we tend to favour graphic rather than data editing. Data editing is where all your notes and any other MIDI events such as modulation, velocity etc., are listed in a continuous stream scrolling down the screen. It's okay for tiny adjustments, but a complete pain to perform major tasks as you're presented with too much information with no point of reference.

Preferably the graphic editing should show clearly defined oblongs, or some such icon, against a graph background. Believe it or not, traditional music notation is not really accurate enough for fine work.

There's another style of editing where a piano keyboard is displayed and the notes roll down toward it much in the manner of an old-fashioned piano roll. Quite neat for a quick fix. Usually both graphic and piano roll editing are set against a data stream as well, so you get the best of both worlds. However this may well be up in the major money bracket. Naturally any editing should be able to be undone and notes should be heard as you click onto them before making changes.

Along with editing is the quantize function. This is an area of editing which has expanded remarkably. The original idea was to correct the timing of the notes which you put in. You decide to what nearest value you wanted the notes rounded up to and the program corrected them, shuffling them up as requested. However it's now possible to have all different types of quantize, nearly all of them in an effort to re-inject a human feel into what could otherwise be a very monotonous mechanical track. The detail varies from program to program, but we would recommend any which offer a fairly wide variety.

Finally, the ability to arrange all the tracks into a song is quite important. The better loved programs do this in a very visual way so that you can see clearly what track is playing where and when.

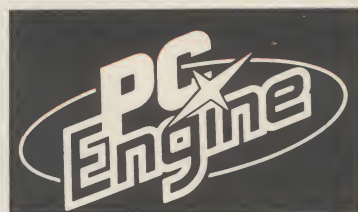
VOICING SOFTWARE

As mentioned in the MIDI section, one of the computer's great advantages is the ability to display voice data on screen — let you set it up for your synthesizer and then store away a

“Just like a word processor, the ability to cut, paste, copy and move any defined chunk of music is also vital”

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Vidi-ST 16-tone video frame grabber inc. digitising software	£95.00
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Philips CM8833 stereo version of above CM8832, plus A/V inputs	£229.00
ITT CP3228 16.5" remote ctrl TV/Monitor, with ST cable	£229.00
Pace Linnet Modem Pack, includes cable and Comms software	£179.00
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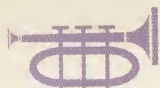
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SUPPLIER DETAILS

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Computer Music
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☎ 0782 744707

DHCP

☎ 0440 61207

Eidersoft

☎ 0234 273000

Electronic Arts

☎ 0753 49442

EMR

☎ 0702 335747

Goodman PDL

☎ 0782 335650

HB Marketing

☎ 0895 444433

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☎ 01 736 4771

Hybrid Arts

☎ 01 4449126

Innovated Software

☎ 0903 213614

MCM

☎ 01 724 4104

Microdeal

☎ 0726 68020

MicroIllusions

☎ 0480 496497

Music Machine Club

☎ 05242 62258

Program Shops Ltd.

☎ 01 316 7777

Silica Shop Ltd.

☎ 01 309 0300

Soundbits Software

☎ 021 733 2063

Syndromic Music

☎ 01 4449126

disk as a library. Setting up sounds on any synth is a real pain; you can't see what you're doing and you're dealing with numerical data only on a tiny screen.

What you should be looking for from any voicing software is the ability to see in graphic form exactly what the wave forms are that go to make up the sound. Changing that sound should be a matter of dragging points of the graph around with the mouse — although there are some that display graphs but only change the shape when you alter the numbers listed underneath. It's a great help if you can play the instrument's keyboard. Many programs now have a random voice generating function that sets up sounds arbitrarily which gives you a nice basis on which to hone up unusual sounds.

SAMPLING PROGRAMS

The quality of the sample depends on the computer of your choice. However it is worth picking up a few pointers as to what a sampling program should have. The wave form obviously should be clearly displayed. Sections of it should be able to be block marked and either cut and pasted elsewhere, copied, or zoomed in on, so that they fill the screen and let you work in finer detail.

If your computer does not have provision for sending the sound to an external amplifier the appropriate sockets should be provided on the hardware — all sampling programs require hardware to perform the analog-to-digital conversion. Refinements to the program may be a choice of sampling rate, maybe some filtering option to clean up the sound, and in some cases, a three-dimensional display. MIDI should be also part of the program so that the sound created can be played back via MIDI from either a keyboard or sequencer. However this needs two computers (!) if you don't have a program which incorporates sequencing and sampling in one module. The lack of any MIDI options relegates any sampling software into the novelty league.

EPILOGUE

There is an awful lot of musicware about — you only have to go to any of the computer or music fairs to see the cross-overs as companies from either camp appear at either. This is also true at the very top end of the market where computer music systems have been

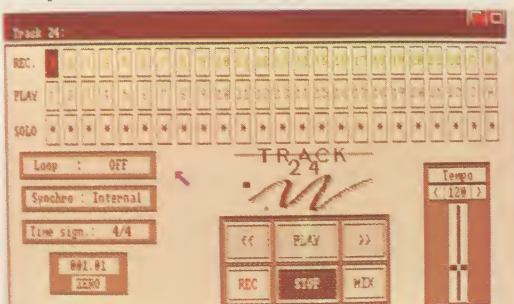
around for ten years or more. They cost serious money and can weigh in as much as the price of a modest Docklands flat or a Scottish Castle.

For our ideal system, we would have probably two or three central computers: Amiga, Atari ST, and probably either an Archimedes or a Mac (the latter was not considered as the prices are well out of the league of the average user). Amiga to run *Music X*, Atari ST to run *Notator* and other C-Lab voicing software which gets smarter every time we see it. The purpose of the Archimedes or Mac is that they are fast enough to run very sophisticated video synchronization programs — although the latest version of C-Lab's *Notator* does this as well. The MIDI systems would link them all together and parts can be thrown around from one to the other.

As to the actual sound generating system — several tone modules, notably Yamaha TX81Z and Roland D110 and U110 would start us off along with Korg M1 rack mount version and an Akai S1000 sampler. The master keyboard could be either an old KX88 — a Yamaha mother keyboard — mute on its own but a good controller, or really any keyboard which is velocity and pressure sensing; why not a good old DX7 as there are more voices available for this than any other synth?

We would also like sound processors which are controllable via MIDI — multi-effects units like the SPX500 and the like. A digital mixing desk like the Yamaha DMP7 which can be expanded by getting one or two of them together would help you do this for the ST. Scouting around for an Aphex Aural Exciter or DBX Sound Expander would give the sound a real boost in sonic range and the final mix is recorded onto the DAT (digital audio tape) for sure-fire noiseless sound. Ah well... by the time we can afford that little lot the hire of the Zimmer frame will outweigh all other priorities.

Soundbits Software's Track 24 sequencer





SEQUENCERS

Instant Music	Electronic Arts	PC/Amiga/Atari ST	£19.95
Creator	C-Lab	Atari ST	£299.00
MRS	Dr. T's Music Software	Amiga	£49.95
KCS 1.6A	Dr. T's Music Software	Amiga	£225.00
		Atari ST	£199.95
KCS Level II	Dr. T's Music Software	Amiga	£275.00
		Atari ST	£275.00
Soundscape Pro			
MIDI Studio 1.4	Mimetics	Amiga	US\$179.95
Texture	Sound Quest Inc.	Amiga	US\$165.00
Sonix	Aegis Development	Amiga	£57.50
Dynamic Studio	New Wave Software	Amiga	£69.95
MIDI Magic	Brown-Wagh	Amiga	US\$149.95
MIDI Music Manager	Datel Electronics	Amiga	£39.99
Notator	C-Lab	Atari ST	£485.00
Guitaristics	Dr. T's Music Software	Atari ST	£85.95
Opus One MCL	Ariadne	Amiga	£99.95
Track 24	Soundbits Software	Amiga/Atari ST	£75.00
EZTrack	Syndromic Music	Atari ST	£49.00
16 Track Sequencer	DHCP	PC	£79.95
Voyetra Sequencer Plus MKI Computer	Music Systems	PC	£96.00

SCORING

Deluxe Music			
Construction Set	Electronic Arts	Amiga	£49.95
The Copyist Apprentice	Dr. T's Music Software	Atari ST	£79.95
The Copyist Professional 1.6	Dr. T's Music Software	Amiga/Atari ST	£199.00
The Copyist DTP	Dr. T's Music Software	Amiga/Atari ST	£299.95

VOICING/PATCH EDITORS

CZ Android	Hybrid Arts	Atari ST	£75.00
3D Programmer	Soundbits	Atari ST	£75.00
Sound Generator	Goodman PDL	Atari ST	£2.95
SoundSynth	EMR	Archimedes	£49.95
C-Zar	Diemer Development	Amiga	US\$195.00
MIDIMan	Hollis Research	Atari ST	£79.00
X-OR	Dr. T's Music Software	Atari ST	£199.00

SAMPLING/SAMPLE EDITING

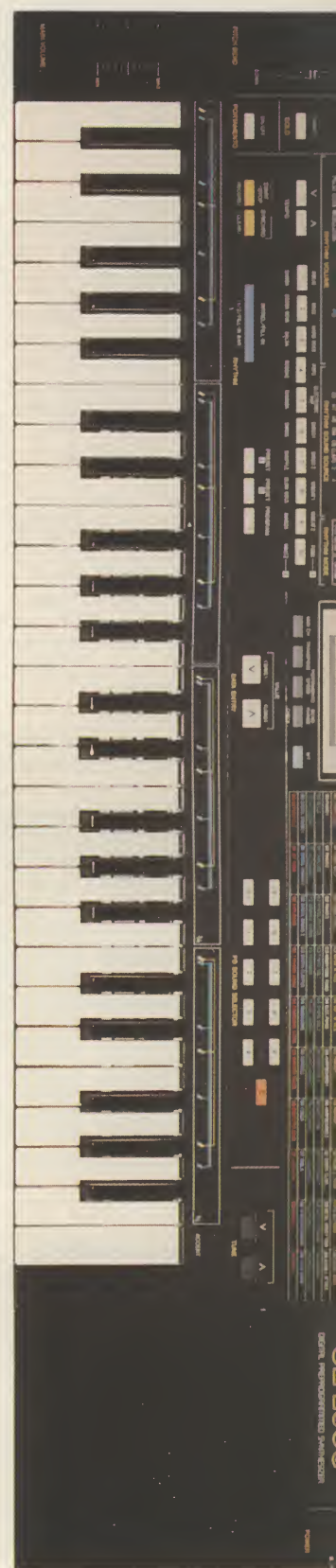
EMR Sampler	EMR	Archimedes	£126.50
Pro Sampler Studio	Datel	Amiga	£69.99
Replay 4	Microdeal	Atari ST	£59.95
PerfectSound	Sunrize Industries	Amiga	US\$89.95
StudioMagic	Sunrize Industries	Amiga	US\$99.95
FutureSound	Applied Visions	Amiga	£89.95
A.M.A.S.	Microdeal	Amiga	£75.00
IS Sound Digitiser V3.7	Innovated Software	Atari ST	£69.95
Pro Sound Designer	Eidersoft	Amiga	£75.00
Audiomaster II	Aegis Development	Amiga	£69.95
Synthia	The Other Guys	Amiga	£79.95

MULTI-FUNCTION/SUPPORT

Deluxe Music Construction Kit	Electronic Arts	Amiga	£49.99
Music Studio V3.0	Activision	PC/Amiga/Atari ST	£29.95
M	Intelligent Music	Amiga	£195.00
		Atari ST	£185.00
MIDIGrid	Composers Desktop Proj.	Atari ST	£134.55
Music-X	Microllusions	Amiga	£229.00
EMR Studio 24	EMR	Archimedes	£99.00

MIDI EQUIPMENT

Datel MIDI Interface	Datel Electronics	Amiga	£34.99
Dr. T's Model A	Dr. T's Music Software	Amiga	£69.95



CCEG

V14
59



VALUE-FOR-MONEY MUSIC PROGRAMS

Impossible though it is to be all things to all people, we have tried to draw up a list of recommended best buys in all the categories with a brief resumé of its functions.

Internal voice programs

SOUND GENERATOR

Goodman PDL — Atari ST £2.95

A good on-screen sound creator, well about as good as you can get for the ST's chip. Moving sliders about alters the tones.

SONIX

Aegis Developments/HB Marketing — Amiga £64.95

Excellent voicing program and one of the few that actually does synthesis. Draw your own waveform and learn about sound creation in a friendly environment. Also has built-in sequencer and limited MIDI functions.

SOUNDSYNTH

EMR — Archimedes £49.95

Comprehensive sound editor and creator with fast display and waveform drawing facilities. Extra disks of sampled sounds are also available which are compatible with any program using sound files.

INSTANT MUSIC

Electronic Arts — PC, ST and Amiga

Probably the easiest and non-musician type sequencer about. Good fun with good samples to play with. Has built-in help to make sure you play the correct notes, chords and harmony. No MIDI. Well documented and helpful.

Sample players

PD SOFTWARE

To be honest every public domain software dealer has both sample players and fun-time novelty programs aplenty, although as you might guess the pecking order starts with the ST and runs down through Amiga to PC. Take your pick!

MIDI sequencing

TRACK 24

Soundbits Software — Atari ST and Amiga £75

Well priced piece of software that offers lots of facilities. Uses traditional music notation display.

SUPER CONDUCTOR

Microdeal — Atari ST £35

Very popular and easy-to-use sequencer. Has very good arrange section with excellent graphic displays.

THE WADDINGTON SEQUENCER

Public Domain — Atari ST

Useful 64 track MIDI sequencer. Limited facilities but a nice and cheap way to get used to MIDI sequencing. No notation displayed at all.

EZTRACK

Syndromic Music — Atari ST £49

Good sequencer and one that is compatible with other 'EZ' sequencers and scoring programs.

DR T'S MRS

Dr. T's Music Software/MCM — Amiga, PC, Atari ST £49.95

Reasonable sequencer which can be upgraded into a larger and more competent version. Has a few odd features and data-stream only editing. Amiga version will play internal voices.

MUSIC MACHINE CLUB

Spectrum

The club have info on most of the music software that runs on the various interfaces now obtainable only second-hand.

16 TRACK SEQUENCER

DHCP — PC £79.95

Reasonable sequencer if a little old-fashioned nowadays. But nevertheless efficient. Price includes interface.

VOYETRA SEQUENCER PLUS MKI

Computer Music Systems — PC £96

Bottom-of-the-rung program from a big software house dedicated to music products. You need to shell out more for the interface. The program uses simple graphic editing but can be upgraded to the big expensive versions.

Voicing

CZ ANDROID

Hybrid Arts — Atari ST £75

Best voicing software for CZ series of synths which are to be had now at bargain prices. Use this and stand them on their heads!

3D PROGRAMMER

Soundbits — Atari ST £75

Soundbits Software have come up with a smart piece of software that not only covers the D110 but will also do for its smaller cousin, the MT32, and the keyboard versions D10 and D20.

MUSIC X (see multi-function programs)

There are also many public domain programs that will act as librarians and random sound generators for most popular synths.

Sampling

A.M.A.S.

Microdeal — Amiga £75

Good sampling with MIDI interface thrown in and well catered for.

PRO SOUND DESIGNER

Eidersoft — Amiga £75

Several versions of this about but quality

is good, especially if you get the 'Gold' version. MIDI catered for but no interface.

FUTURESOUND 500

Applied Visions/HB Marketing — Amiga £89.95

Good sampling and editing. No MIDI so you will have to download to play them properly. Sound quality is very clean though.

I.S. DIGITISER

Innovated Software — Atari ST £69

Clever sampling package with add-on software for MIDI and some fancy waveform displays.

REPLAY 4

Microdeal — Atari ST £59.95

The original sampling package. Look out for earlier versions on PD. However the package as it stands includes the all-important hardware. MIDI available on version 4.

EMR SAMPLER

EMR — Archimedes £126.50

Good, but at a price. Has all the features you need for sampling but you have to download them into other programs to hear them sequenced or from MIDI.

MIDI and internal voice, multi-function programs

DELUXE MUSIC CONSTRUCTION KIT

Electronic Arts — Amiga £49.99

Package includes MIDI output, sample playing and sequencer that is OK, if you can use traditional notation.

MUSIC STUDIO V3.0

Activision — PC, Atari ST and Amiga £29.95

Comprehensive package that includes waveform editing, MIDI in and out and output. Still, you have to understand traditional notation to get the best out of it.

MUSIC X

MicroIllusions/Silica Shop — Amiga £228.85

Really the most comprehensive program we have seen as it covers everything bar sampling. If you can stretch to this one, go for it. It is actually cheaper than buying all the component software separately. A really professional program that can be used by anybody. It also programs synths like the CZ, D50 and TX81Z. It files any MIDI instrument and is very well thought out.

EMR STUDIO 24

EMR — Archimedes £99

Odd in a couple of places but otherwise a reasonable package which makes use of the internal voices on the Archie — eight at any one time.

SONIX

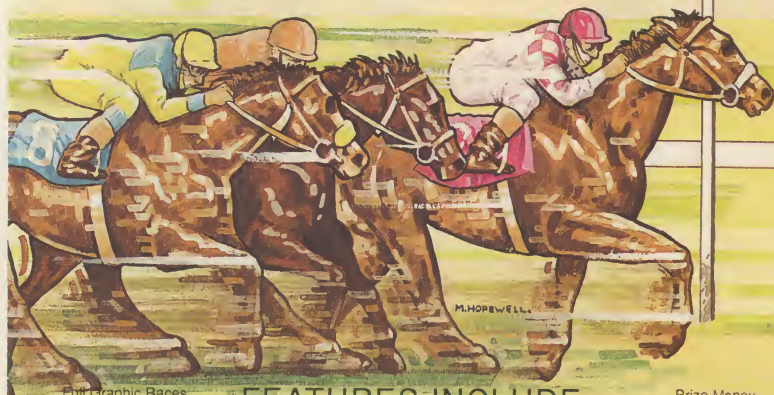
Aegis Developments/HB Marketing — Amiga (see internal voice programming section)

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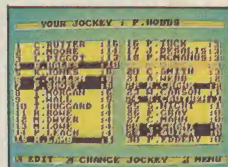
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GLOSSARY

MIDI Musical Instrument Digital Interface

Tone Module a synthesizer without a keyboard

Sampler a device that digitally encodes and decodes sound, usually allowing you to manipulate it

Track a part of the sequencer assigned to recording and playing back one musical part

Channel one of the 16 MIDI transmitting and receiving channels

Quantize to 'round-up' notes, either in time or another specified peripheral to the nearest value you have told it

Event anything recorded via MIDI

Multi-timbral able to create more than one sound simultaneously which can be controlled via separate MIDI channels



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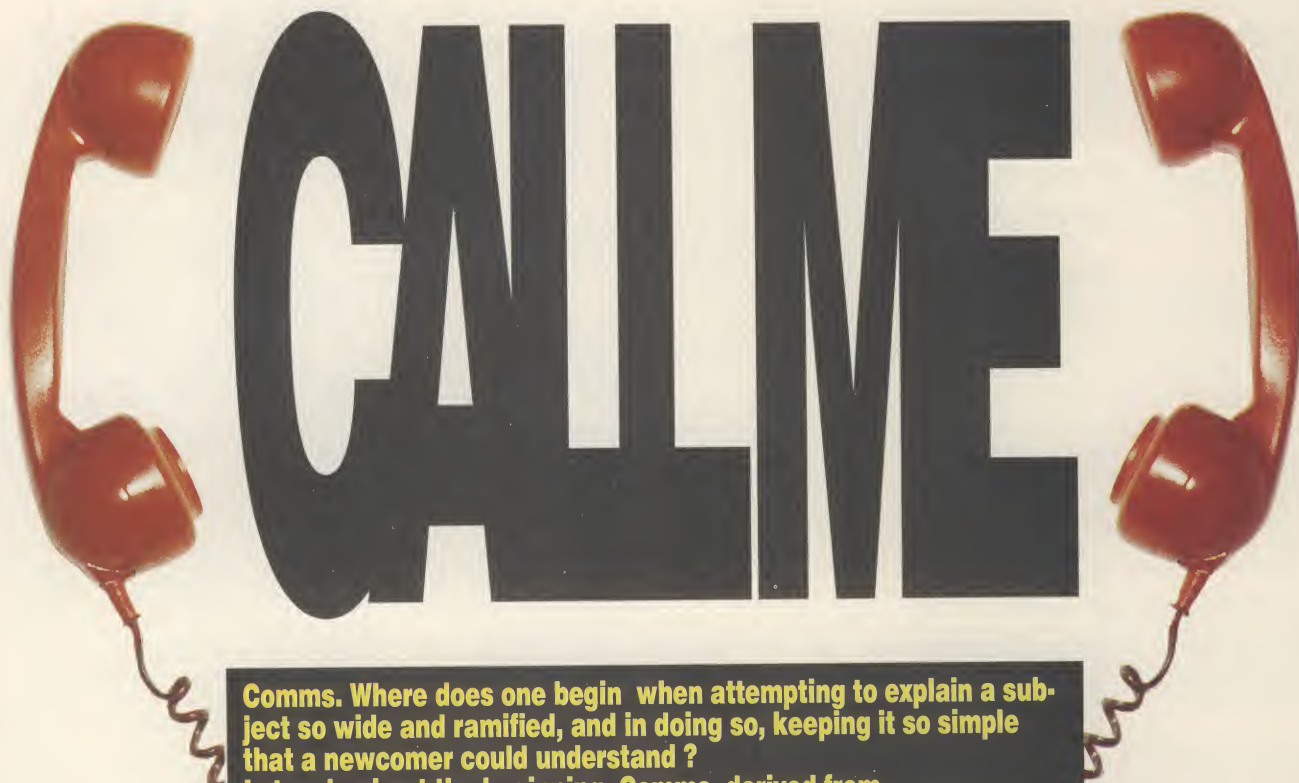
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Compunet, Unit 26, Sheraton Business Centre, Wadsworth Road, Perivale,
Middx, UB6 7JB. For enquiries and Access/Visa orders ring: Tracy on 01-997 2591.

- Please send me the Compunet Information Pack with details of your modem offers.
- I already have a suitable modem for my ST or Amiga (i.e. Linnet, Linnet 1200, any Hayes compatible and most "dumb" modems). Please forward the Compunet terminal software, registration and Free month access for £24-95.
- Please send me the Compunet modem for C64/128 plus software, registration and Free month access for £39-95.

Name _____
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X1



Comms. Where does one begin when attempting to explain a subject so wide and ramified, and in doing so, keeping it so simple that a newcomer could understand?

Let us begin at the beginning. Comms, derived from Communications, is simply the term used to describe the passing of information from one computer to another, via a telephone wire. There, simple enough. Ah, if only life were that simple. The trouble with comms is that while the concept is relatively simple, putting the theory into practice makes things more complicated. Unfortunately, each computer system has its own way of dealing with communications, each needing its own specialised hardware, software, etc. Once you've jumped that hurdle, then the rest is plain sailing. We'll deal with the requirement side of things at a later date - let's first look at what's on offer in the way of services.

This being an entertainment guide, I've decided to keep away from producing endless lists of systems, modems, and the like. What is on offer is a personal view of the best available to get you started in this interesting, informative and, above all, fun use of your home computer.

Two comms services stand out in my mind as providing the most enjoyment to the home leisure user - Compunet and Micronet. Both are accessible to a wide spectrum of home computer owners, be they 8 or 16-bit, and both offer a varied selection of services which are described in the appropriate information panels.

BULLETIN BOARDS

Compunet and Prestel are both examples

of Bulletin Boards, albeit highly successful, commercial types. Wait a mo...whats a Bulletin Board?

Imagine the blackboard in the classroom at your school or college, wiped clean and totally devoid of writing. First the teacher or lecturer comes along and writes some totally boring piece of prose on it. When he's left the room, some clever dick will scribble a smart comment or two underneath what's just been written. Aforesaid teacher will re-enter, remove the offending text from the board and the culprit from the classroom. Occasionally, somebody nobody is aware of will come along just when nobody is taking any notice of the board, write something which is well worth taking notice of, and disappear again. Over a period of time, important and not so

important messages will appear, be read and deleted. Transfer this analogy into bits and bytes and, hey presto, you have a Bulletin Board.

Well, perhaps not quite THAT straightforward, but you get the basic idea. A Bulletin Board (BBS) is akin to a blank piece of paper or blackboard (which is actually where the term Bulletin Board originates from, humm) simply aching to have something written on it - it doesn't care what it contains, as long as it is filled with something. Of course, you can't have people writing ANYTHING onto BBS's (for example, there have been recent cases of BBS's being used as contact lines for perverts, football hooligans and similar social misfits) so someone has to take on the task of monitoring the board, patrolling the system and

COMMS - THE BEGINNER'S GUIDE TO ALL THE STRANGE JARGON!!

BAUD

A word, originating from America, used to describe the speed at which a modem sends and receives information, measured in bits per second (bps). A 1200/75 modem sends data at 1200 bits per second and receives 75 bps, while a 300/300 both sends and receives information at 300 bps.

BULLETIN BOARD

A computerised 'blackboard' onto which information of any kind can be written. May be one of two kinds:

Open User Group

Where access is given to anyone

Closed User Group

Must be registered with the Sysop before being allowed to use the bulletin board.

COMMUNICATIONS

Comms for short. The term used to describe the action of linking and passing data between two or more computers via the telephone network.

COMPUNET

A commercial bulletin board, owned and operated by the company of the same name, offering a range of services to a wide selection of computer owners.

DOWNLOADING

The term used to describe the action of grabbing information from the computer to which the user is linked to and storing it for his/her own use.

ELECTRONIC MAIL

Also known simply as e-mail. A fast, relatively inexpensive way of sending written information via a computer and modem. Used almost exclusively by businesses.

FULL DUPLEX

A modem which allows data to travel in both directions at the same time.

GATEWAY

Allows entry into an entirely different system to the one currently in use. Prestel is a gateway to the Shades computer, for example.

HALF DUPLEX

A modem which allows data to travel in only one direction at any one time.

MICRONET

A subsection of Prestel, devoted to home and small business computing.

MODEM

A peripheral device which allows computers to 'talk' to each other via the telephone network.

PRESTEL

A commercial bulletin board, owned by the Telemap Group, used by around 100,000 subscribers.

SYSOP

System Operator. Controls the day-to-day running of a bulletin board. Usually its owner, too.

TELEMAP

A company, set up in 1983 by British Telecom and EMAP, to oversee the running of Prestel and its subsections, including Micronet.

UPLOADING

The term used to describe the action of taking information from the user's system and transferring it to the computer to which he is linked.

MICRONET

Owned and operated by the British Telecom, Micronet is not, as many people presume, a stand-alone service. It is, in fact, one of the most widely used Closed User Group of the enormous Prestel network (Prestel is one of the largest databases in the UK, holding over half a million pages of information varying from weather reports to the latest prices from the Stock Exchange).

Micronet, like Compunet, is not machine dependent in any way.

Although it is fairly pointless to cover all of Micronet's many services (most, after all, work along similar lines as Compunet's), there are a few areas worth mentioning.

DialTalk

The Micronet pretender to the PartyLine throne, and a successful one at that. A widely used service, DialTalk is presented like an adventure game at first (for instance, using a LOOK command in the main reception area informs the user of deep-pile carpets and the like), but soon opens up into a seriously interesting conferencing facility. Rooms are available in a similar vein to those of PartyLine, but the difference with DialTalk is that you need never be rudely interrupted by undesirables; each room has a door and a window which can be covered by a blind. When all of your guests are congregated in the room, you simply lock the door and close the blind - thatway, not even the most determined gatecrasher can gain access to your conversation.

Telesoftware

Why venture out of the house when you can purchase that latest Smash, Sizzler or Gold Medal over the modem! Software is available on Micronet from a plethora of companies, often at considerably discounted prices compared with those from more conventional retail chains - useful if it's cold outside and you haven't enough cash to get the bus! And don't believe the old adage that 'you can't get something for nothing in this world' - The Telesoftware Gateway provides a large amount of downloadable software which is free, gratis and for nothing!

Shades

First there was M.U.D. - now there's Shades. While the original MUG was very limited in its gameplay, Shades contains a complex adventure underneath its multi-user capabilities. The object of the game, like so many others of its ilk, is to become the highest-ranking player in the game - in this case, Arch-Wizard. Achieving such a position takes a LONG time, and the collection/use of many objects. Points are awarded for utilising most objects, but a score of 50,000 plus (the bare minimum required to attain Arch-Wizard status) means a lot of items - after all, ultimate power is a sought-after commodity (there are only a couple of Arch-Wizards, including the game's creator!). Incorporating that much-loved factor of MUGging - the EMOTE command (type in something such as 'Throw {character} against the wall' and watch it happen before your eyes!) and complete with the usual mix of ruins, castles and dark woodlands, Shades is THE Micronet MUG, being one of the few scrolling Viewdata services available, as well as a jolly good romp in its ownright.

Starnet

This is a space strategy game, where you play the star captain and aim to become the emperor of the universe (play by electronic mail).

Xtra

is Micronet's leisure/entertainment magazine and includes media, music, humour, gossip, technology & gadgets etc.

Gallery

gives you the chance to be your own publisher by taking pages on Micronet and updating them with whatever you like (within reason!).

Electronic Mail

There are around 4,000 Compunet members to send mail to. Micronet users can communicate with over 75,000 members via email, plus use the telex system.

Teleshopping

Okay, so you can buy the latest games through Micronet, but what about a new joystick, or even a hi-fi? No problem, thanks to the Teleshopping service! While Micronet itself gives access to general computer-related items only, it's possible to access the likes of the Littlewoods Catalogue central computer and order whatever you wish (so long as it's available on their system). This facility has never really taken off in a big way in this country (mainly for the fact that not many people know about it!) but hang on in there - Teleshopping could be the downfall of the local corner shop, if not your local Gateway!

Although both Compunet and Micronet offer the same type of facilities, they differ wildly in the way their information is presented. While Compunet uses a mixture of low and high-res graphics on screen (hi-resolution crops up most notably in demos, to give the best possible effect) Micronet, indeed the whole Prestel network, utilises what is known as Viewdata. 'What in heaven's name is Viewdata?' I hear you cry. Most of you must have seen, if not own at home, a TV which can display Teletext (Ceefax and Oracle). Notice how the graphics held on each page of information are made up of small blocks? Well, that's Viewdata for you. And while not nearly as elegant as the beautifully bitmapped Compunet efforts, this system works well, is easy to read and quick to produce.

RUNNING COSTS:

Micronet is a local call anywhere in the UK - this means just 50p an hour in telephone charges.

Micronet subscription is £23 a quarter

FREE MODEM OFFER: Pay a year's subscription in advance and you receive free a modem (GEC Datachat 1223 with a RRP of £119.95!):

AMIGA £147.95, AMSTRAD CPC £154.95, AMSTRAD PCW £123.95, PC COMPATIBLES £123.95, ATARI ST £137.95, BBC B/MASTER/COMPACT £97.95, COMMODORE 64/128 £137.95, SINCLAIR SPECTRUM 16K/48K+2 £95.90

(These prices include modem, software and a year's subscription)

Connect charges range from 0p, 1.15p and 8.05p per min depending on time of day.

COMPUNET

Compunet has been in operation for six years from September 1984, and during that time has changed very little in format. Originally available to C64 owners only, it has now been expanded to cater for Amiga and Atari ST users, and, over the next few months, shall be accessible to owners of Spectrum, Amstrad and PC machines. What is most notable about Compunet is the amount of interaction possible within the system, an aspect which, in many people's minds, has kept the service at the top of the leisure-related comms chart since its launch. Although most users of Compunet are interested in only a couple of its services, there are a staggeringly large amount of uses which the service can be put to, a selection of which are highlighted below.

Partyline

Compunet's real-time interactive chat service. Partyline will be covered in full detail later in this feature.

Demos

The aspect of Compunet which most people initially join for. A demo (or demonstration) is just that - a demonstration, usually graphic or audio (or both) of the capabilities of the computer on which it has been produced. Although a large amount of current demos available on Compunet employ similar, if not exactly the same, ideas and implementations, there are some outstanding examples of work on show. The range of demos to be viewed is enormous, and varies wildly from computer art to music (be it original, sampled or a combination of both), to some quite staggering 'mini movies'. After a considerable lull in quality (mainly due to the service's almost total loss of 'big-name' programmers such as Rob 'so many tunes there isn't the space to print them all' Hubbard and Bob 'my God, those graphics are amazing' Stevenson to name but two) talent is once again beginning to shine through.

Federation II

A MUG which is relatively new to Compunet, Federation II (or just Fed, as most players call it) can be best described as a text version of the classic game Elite. The setting for Fed is our own Solar System, many years into the future, where spacecraft really exist and the price of a person's life is negligible next to that of a full cargo bay. Trading is the key to progress, indeed, to your ultimate survival; there's a fluctuating Stock Exchange on one of the planets which affects the price of every sellable item in existence - make the wrong purchase and you could be begging for your next drink at Chez Diesel (Social Centre of the Universe). Enough experience at there tail side of life boosts your rating; once your a reputable member of the Solar System you can have a go at tackling the in-built adventure which opens the door to a whole range of possibilities - even ruler of the System!

Mail

Need to get in contact with a fellow Netter? Don't have the time to wait for a letter? Can't use the telephone because your modem is plugged in? No problem! Send a letter via Compunet! With this facility, it's possible to contact any Compunet user within seconds - simply type what you want to say, then 'mail' it off to his/her ID. The service that makes the Royal Mail look a laughing stock.

Reviews

Compunet even has its own resident software reviewers! Each week, a regular team of Netters look at a selection of new titles, be they full-price or budget, and give their opinions as to what is worth shelling out the ready for. They'll be putting magazines out of business soon! Not only that, but there is also a rundown of the latest demos to be uploaded, with ratings for each program covered.

PARTYLINE

Can't be bothered to toddle along to the youth club or disco, but desperately need to chat with someone? Simple! Log into the Compunet PartyLine service.

The service has been available to Compunet users since the dawn of the Net, and although having changed very little during that time, remains one of the most well-used areas of Compunet. With PartyLine, it's possible to chat with up to eight other Netters at any one time, using your computer and modem. Vertically scrolling software is used to present information on screen, the bulk of which is taken up by the output area (the part of the screen which displays the conversation, along with any other information you require). Underneath the output screen is a smaller (around a quarter of the screen) input window, into which you enter your commands/chat.

Users log into an area known as LOBBY, but can create new areas (or ROOMS) at any time with one simple command. This facility of 'house-building' gave PartyLine its name - it's like holding a party in your own digital home, a home which can grow and grow to your heart's desire. Should you wish to enter a room but allow only certain guests into it, you can create a room with a lockable door, which is a great fuel for in-Net arguments ('Why won't you let me into your room, you !?#!').

Being a real-time service available to all and sundry, it's surprising how many different types of characters you can meet at one sitting. And the fun factor about PartyLine is that, because no-one can actually see you, you can be anyone you want to be; a nasty piece of work if you're usually a kind, thoughtful person, or vice versa. You can even alter your name (or ALIAS) to suit your current personality!

There are chatlines and there are chatlines. And then there is PartyLine!

RUNNING COSTS

Registration charges:

COMMODORE 64/128 Standard £22, Gold £39.50 a quarter

AMIGA/ATARI ST Standard £36.95, Gold £54.45 a quarter

MODEM PACKAGES:

COMMODORE 64/128 modem, user guide and 1 months access £39.95

COMMODORE 64/128 modem, user guide and 3 months Standard £49.95

COMMODORE 64/128 modem, user guide and 3 months Gold £69.95

AMIGA/ATARI ST Pace Linnet modem, cable, software, manual + 3 months Standard £163.50

AMIGA/ATARI ST Pace Linnet modem, cable, software, manual + 3 months Gold £183.50

AMIGA/ATARI ST Pace Linnet 1200 modem, cable, software, manual + 3 months Standard £226.50

AMIGA/ATARI ST Pace Linnet 1200 modem, cable, software, manual + 3 months Gold £246.70

SUBSCRIPTIONS:

Standard (inc 500 p/d storage) £12.00 per quarter, Gold (inc 2000 p/d storage) £29.50 per quarter

Gold subscription only £19.50 per quarter; Bulk storage 45,000 p/d p.q. £10; Personalised ID £10

(Gold carries a number of privileges)

ON LINE CHARGE:

Prime Time Connect (8-6 weekdays) £4.00 per hour; Off Peak via direct London number 80p per hour

Storage 1p per page day (p/d); PartyLine £1.00 per hour; FED II £1.50 per hour

JOINING CHARGES: COMMODORE 64/128 users £10 registration

AMIGA/ATARI ST users £24.95 registration

weeding out the unwanted few, as well as generally keeping the BBS in some sort of decent working order. This person is known as the Sysop - which stands for System Operator - and usually he is the chap who originally started the BB.

As I mentioned earlier, the likes of Compunet and Prestel are commercial examples of Bulletin Boards - their purpose is to give the users what they desire, but also to make a bit of cash in the process. Most boards don't operate in this way - their Sysops design, launch and run them more out of love than money, receiving nothing from the users save a useful piece of info here and there and a pint or two should they ever meet in person (it's not unknown for BBS Sysops and users to organise meets!). And it's because of this freedom of being able to do such a thing as setting up your own board that hacking has flourished the way it has; after all, a lot of Sysops are (or would like to be) hackers, many of whom starting their BBS's to get in touch with others of their kind, thus dispensing with the need to congregate on a freely accessible, commercial system where their 'secrets' may be overheard by someone not part of the clan.

Privacy is obtained by setting up a BBS as a CUG - Closed User Group. Whereas open boards can be accessed by anyone with the correct hard/software, prospective CUG users must register with the Sysop before being allowed to use the board to its fullest, thereby giving the chance to both keep a record of exactly who is using the service and ensure that someone who shouldn't be logged on isn't. Hacking isn't the only reason for bulletin boards though; a BBS can be set up to deal with any subject, or none in particular - it's entirely up to the Sysop. After all, he's ultimately in charge.

And the rest, as they say, is up to you. Check out the glossary of comms-related terms, then toddle down to the nearest computer store - they'll be able to supply you all you need in the way of peripherals, software and etcetera. After that, it's party time. Phone and enjoy!

CCEG



...it's dynamite!

POWER CARTRIDGE

FOR YOUR COMMODORE

64/128

SO MUCH FOR SO LITTLE

- * POWER TOOLKIT
- * POWER MONITOR
- * TAPE & DISK TURBO
- * PRINTERTOOL
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YOU WILL
WONDER HOW YOU
EVER MANAGED
WITHOUT IT

TRADE AND
EXPORT
ENQUIRIES
WELCOME

42 Page
manual

16 K
OUTSIDE
operating system



A special KCS switching technique allows a program to be stored completely outside the memory of your Commodore 64/128. Using this system KCS developed the POWER CARTRIDGE. The 16K Cartridge, 100% machine code, gives the user an ideal extension to his normal computer.

POWER TOOLKIT

A powerful BASIC-Toolkit (Additional helpful commands) that considerably simplifies programming and debugging.

AUTO	HARDCAT	RENUMBER
AUDIO	HARDCOPY	REPEAT
COLOR	HEXS	SAFE
DEEK	INFO	TRACE
DELETE	KEY	UNNEW
DOKE	PAUSE	QUIT
DUMP	PLIST	MONITOR
FIND	ILOAD	BLOAD

RENUMBER : Also modifies all the GOTO's GOSUB's etc. Allows part of a program to be renumbered or displaced.

PSET : Set up of printer type.
HARDCAT : Prints out Directory.

The toolkit commands can be used in your programs.

DISK TOOL

Using POWER CARTRIDGE you can load up to 6 times faster from disk. The Disk commands can be used in your own programs.

DLOAD	DVERIFY	DIR
DSAVE	MERGE	DEVICE
DISK		

MERGE : Two BASIC programs can be merged into one.
DISK : With DISK you can send commands directly to your disk.

TAPE TOOL

Using POWER CARTRIDGE you can work up to 10 times faster with your data recorder. The Tape commands can be used in your own programs.

LOAD	SAVE	VERIFY
MERGE	AUDIO	

POWERMON

A powerful machine language monitor that is readily available and leaves all of your Commodore memory available for programming. Also works in BASIC-ROM, KERNAL and I/O areas.

A ASSEMBLE	I INTERPRET	S SAVE
C COMPARE	J JUMP	T TRANSFER
D DIS-	L LOAD	V VERIFY
ASSEMBLE	M MEMORY	W WALK
F FILL	P PRINT	X EXIT
G GO	R REGISTER	S DIRECTORY
H HUNT		DOS Commands

PRINTERTOOL

The POWER CARTRIDGE contains a very effective Printer-Interface, that self detects if a printer is connected to the Serial Bus or User-Port. It will print all Commodore characters on Epson and compatible printers. The printer-interface has a variety of set-up possibilities. It can produce HARDCOPY of screens not only on Serial

printers (MPS801, 802, 803 etc) but also on Centronic printers (EPSON, STAR, CITIZEN, PANASONIC, etc). The HARDCOPY function automatically distinguishes between HIRES and LORES. Multi-colour graphics are converted into shades of grey. The PSET functions allow you to decide on Large/Small and Normal/Inverse printing. The printer PSET functions are:

PSET 0 - Self detection Serial/Centronics.
PSET 1 - EPSON mode only.
PSET 2 - SMITH-CORONA mode only.
PSET 3 - Turns the printing 90 degrees!!
PSET 4 - HARDCOPY setting for MPS802/1526.

PSET B - Bit-image mode.
PSET C - Setting Lower/Upper case and sending Control Codes.
PSET T - All characters are printed in an unmodified state.
PSET U - Runs a Serial printer and leaves the User-port available.
PSET Sx - Sets the Secondary address for HARDCOPY with Serial Bus.
PSET L1 - Adds a line-feed, CHR\$(10), after every line.
PSET L0 - Switches PSET L1 off.

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POWER RESET



On the back of the POWER CARTRIDGE there is a Reset Button. Pressing this button makes a SPECIAL MENU appear on the screen. This function will work with any programme.

CONTINUE - Allows you to return to your program.
BASIC - Return to BASIC.
RESET - Normal RESET.
TOTAL - Saves the contents of the memory onto a Disk. The program can be reloaded later with BLOAD followed by CONTINUE.
BACKUP - RESET of any program.
DISK - As BACKUP DISK but to TAPE.
RESET ALL -
TOTAL -
BACKUP -
TAPE -
HARDCOPY - At any moment, prints out a Hardcopy of the screen. Using CONTINUE afterwards you can return to the program.
MONITOR - Takes you into the Machine language Monitor.

BDL

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UK orders add £1.20 post/pack total — £16.19 incl. VAT.
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Scandinavian Mail Order and Trade enquiries to: Bhiab Elektronik, Box 216, Norrtälje 76123, SWEDEN. Tel: ++46 176 18425 Fax: 176 18401

TECHNOST

There's more than just a pretty screen and sexy sound to the attraction of a computer. If you bother to look under the surface, you might find more character and body' as you delve into the mysterious underworld of chips and software which keep your home computer quietly ticking...

POWER CARTRIDGE

Bitcon Devices' 16K cartridge for the Commodore C64 is an excellent programmer's toolkit offering powerful additional BASIC commands together with Turbo disk- and tape-loaders (which will load and save files up to six/ten times faster than normal), a powerful machine language monitor which leaves all the Commodore memory available for programming. Also included is a versatile printer interface for serial or parallel printers, which includes a hardcopy function for LORES and HIRES screens, converting multi-colour to shades of grey, and the superb POWER RESET backup function. Pressing the Reset button freezes the current program and allows you to save the memory to disk or tape, print the screen or access the machine language monitor. Full instructions are supplied in a 42 page manual.

£14.99

Buying a computer is a precarious business. Why you buy the machine you end up with is governed by so many variable things, from its capacity to store information to its good looks, that it's often difficult to make any kind of decision. It's actually more simple than that, though. Try thinking about it in terms of 'what do you want to do?'. Admittedly you've probably never thought of some of the things you can do with a computer other than play games, and although that's a fine way to spend your leisure time, there's more to computers than that. The technical aspect can be as rewarding as a pastime in itself, like hobby electronics, for instance. You don't have to make something useful, because the fun is in the journey, the process which you went through to make whatever it is. To help you see this larger picture, let me explain some of the things you may not have thought of as mind-expanding computing activities.

Programming

The whole point of computers is that they are a blank sheet of electronic paper, until that is you type something in or load a program written by someone else. In most cases this program will be a game, but it doesn't have to be. The other alternative is to program yourself.

LOAD-IT

Experienced games players know all about the frustration of not being able to load their latest soft hit. Mills Associates have brought back reliability to tape loading irrespective of Turbo recordings and protective Loaders. Load-It achieves 100%



loading success thanks to its permanent head alignment adjustment with the help of an LED array for optimum signal indication. Guaranteed for one year. **£39.99** Check current computer mags for special offer of a free Top Gun/Living Daylights/Temple of Doom video!

Most 8 bit computers, like the Sinclair Spectrum, BBC, Commodore 64/128, and Amstrad CPC, have a programming language already built into their chips. This language is called Basic, and is one of the most widely used programming languages in the world. The 16 bit machines like the PC, Atari ST and Amiga also have Basic language, but you have to load it from disk first. Programs written in Basic can be complex and very large, but few are very fast, so most "real" programming is either written in a compiled language or in machine code.





The reason Basic is slow is that it is interpreted, that is to say when you run the program each line is read and acted upon as it goes along. Compiled languages crush the program down into machine code and so when they run they are much faster. The only problem is that compilers produce very clumsy machine code, and so for purity and the very maximum speed needed for games etc, pure machine code is the answer.

There are many kinds of compiled language for all popular computers, like Pascal, Ada, Modula-2, C, and even a compiled version of Basic or two. C is one of the most modern and widely used at present, mostly due to the fact that the operating systems of the ST and Amiga were written using C in the first place. The ST and Amiga both speak C fluently, but you must buy an extra compiler program, like Lattice C or Aztec C before you can use it. Compilers for C are expensive (about £150) on the Amiga and ST, but not so on the PC or indeed the 8 bit machines. In fact on the PC you can get one in the public domain, called MIX C (from Analytical Engines Ltd), which means if you know someone who has a copy you are allowed to copy it. The drawback is you have to buy a book in order to use it. This is fair enough really. The C compilers for smaller machines like the Spectrum are by necessity slightly cut down versions of the C set of commands, but if you don't plan to market your programs, then that's okay. You'll get a lot out of it even if the rest of the world won't.

Utilities

Other kinds of programs you can load into your machine are utility programs. The best thing about utilities is that often the most interesting ones are in the public domain, and so are available for a couple of quid through PD libraries. Once again utilities are available for all machines, and cover a mind-boggling range of useful tasks. Most are just disk housekeeping routines or WIMP interfaces to make you computer look like the Macintosh or Amiga's mouse and icon environments. But some programs cut across the normal grain and do something really useful. Like the desktop publishing suite by

Cardex (available through Miles Gordon Technology) which runs on the Spectrum, and yet produces high quality print on a simple Epson printer.

Although there is plenty of PD software for the BBC, Spectrum, C64 and Amstrad CPCs, the quantity and quality of PD software available for the PC, ST and Amiga is quite staggering. Hundreds of disks on the ST and Amiga, literally thousands on the PC! You can track satellites, treat photographs, create and study fractal geometry and chaos formulae, monitor your heartbeat, draw graphs, compute the correct diet, convert Basic into C and even view charts of stars based on the current date and time. Virus checkers are around too, which combat the virus problem completely... until the next virus comes along, that is. But rest assured that within a few days of a new virus being discovered, a new program

Hardware

to combat it will be available.

Part and parcel of the techno-universe are add-ons or peripherals. Does your chosen computer support third party hardware? In most cases the answer is thankfully a resounding yes, with all manner of intriguing boxes to bolt onto your computer. You can increase the memory capacity of your machine, and turn it into a dedicated machine for some purpose or another.

MIDI, or Musical Instrument Digital Interface, is a good example. The ST already has MIDI ports built in, but other computers can fit an interface which does the same job. (Note: At first the ST having a MIDI ports seems a good idea, but it is non-standard in some ways, which makes it just as fiddly as buying an interface!). MIDI opens up new musical possibilities, and with a MIDI box you can drive any MIDI synthesiser, like the excellent Roland MT-32, and make complex and beautiful music with a sequencer program. Music X, from Microlusions, on the Amiga is a brilliant new sequencer program which not only allows you to make music, but to edit and store sounds from your synthesiser too. Dr T's Keyboard Controlled Sequencer is another such program, available for the ST, Amiga and C64. The MT-32 is a 'multi-timbral' synth, meaning that it has

Suppliers

Analytical Engines Ltd
PO Box 35 Eastleigh
Hants SO5 5WV
(0703) 262099

Compulink Information eXchange (CIX)
Suite 2 The Sanctuary Oakhill
Grove Surbiton Surrey
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NW8 9PR
01-258-3454

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St Ives Huntingdon
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Micronet/Dialcom
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Hemel Hempstead
Herts HP3 9RR
(0442) 237237

Miles Gordon Technology
Lakeside Phoenix Way
Swansea SA7 9EH
(0792) 791100

PD Software Library
Winscombe House
Beacon Road
Crowborough
East Sussex TN6 1UL
(0892) 663298

Roland (UK) Ltd
West Cross Centre
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TW8 9EZ
01-568-1247

UK Amiga User Group PD Library
66 London Road
Leicester LE2 0QD
(0533) 550993

CCEG

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67

PRINT TO PAPER

Choosing a printer may seem a little difficult when looking through the vast range of advertised products, but provided one checks the requirements and the specific applications, the choice becomes greatly reduced.

In principal there are only a small number of printer groups. If letter quality print is required, choose between daisy wheel and 24 pin LQ (letter quality) printers, as only these will provide a decent print-out. Some low-end daisy wheel printers can be picked up at very low prices (around £100-150), as the market is heading for the faster 24 pin dot matrix printers. For programming work and listings the best solution is a sturdy and cost effective 9 pin dot matrix printer. Prices vary according to speed, but offers in the region of £120 are a reality.

Graphics printing can be achieved with a good 24 pin printer (up to 360 dots per inch), although a perfect ink ribbon is a top requirement. Best of all is the choice of an ink jet, which will give more consistent results.

For colour work again the low-cost solution will be an ink jet printer (impact dot matrix printers with colour ribbons provide

8 voices which you can play at once. It's a virtual 'band in a box'. You can even get a version of this machine to fit inside a PC, making it a kind of music workstation. Even the Spectrum is well served by MIDI, as Cheetah make an interface for both it and the Amstrad CPC, while Datel make them for the Amiga and C64. If you think you're into computer controlled music check the JAM SESSION feature for further details.

Certain boxes plug into the user ports of your computer and perform other functions, like freezing a program so you can make a back-up copy of it, or sending a copy of the screen to a printer or disk. Romantic Robot have made interfaces like this for the Spectrum and Amstrad for years, and once again Datel have cornered the market on the 64. Trilogic, as well as making a lot of VERY useful leads available to the techno at heart, also make some very complex 'red button' boxes, so called because of the snapshot button on the top.

As well as this you can get all manner of boxes to emulate other computers, effectively doubling the amount of software your computer can use. Using a modem you can link your computer to a phone line and access information from other bigger computers hundreds of miles away, and even participate in

online multi-user services like CIX and Micronet.

On the subject of hardware, there is one new product which deserves a special mention, and that is the Lifetime Drive from Miles Gordon Technology. It's an external drive for ANY computer, and provided you have the right lead for it, it will fit the PC, Amiga, ST, BBC, CPC, Spectrum and C64. So now you'll only need ever buy one extra drive for your computers.

COMMUNICATIONS

As I said just now, another sphere of activity you can launch into with a computer and a modem (short for MODulator DEModulator, after the way it sends and receives information down the phone line) is the big wide world of communications. Armed with your modem and a suitable communications package you can access any other computer with a modem, round the corner or even around the world! The main use of comms is to participate in bulletin board services (BBS) or online conferencing services. CIX is a popular online service in the south of England, a place where all manner of folk from the computer industry gather to share information, chat or just sound off about things which bother them. Micronet is the same sort of thing, but with nation-



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VIA
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wide coverage via a local phonecall. Both services charge for timed usage of the service, on top of which you pay the phone bill. Comms is a real tin of worms unless you own a phone network. But responsible usage is economical, and profitable with respect to the information you can glean, especially news which appears ahead of the press, and interactive technical information from a team of experts. Read more about Micronet and Compunet services and how they can benefit you in the CALL ME section on page 62.

EMULATION

Making your computer imitate others is a clever programming trick, and not only that it's very useful. If your computer can accept disks from other computers you are doubling your possible software library. The king of the emulators is the Commodore Amiga, which with the right software and hardware can emulate the BBC, IBM PC (in software and hardware), Apple Macintosh, and Commodore 64. The A-Max cartridge from Readysoft (available from Entertainment International in the UK) makes your Amiga into a very sturdy Mac Plus, and with a Mac drive you can also read and write Mac disks. The Transformer program on the other hand turns the Amiga into a PC in soft-

ware, turning an unmodified Amiga into an elementary PC XT. The speed is terrible, about 1/4 the speed of an Amstrad PC, but it DOES work! You can use any PC program, and it runs. Using another program called Dos2Dos, you can even convert programs from Amiga to PC disk. The ST can do the Mac and PC emulation to, with Spectre 128 and PC Ditto respectively. Spectre 128 (from Hisoft) is even faster than the Mac Plus it emulates! Even the C64 can ape the Spectrum, in Basic anyway. The Spectrum has a C/PM language, enabling you to read disks from a PCW, and a Commodore 128 has onboard C/PM ability, as well as a hardware C64 mode. So even once you've made your choice of computer that's not necessarily the end of the road.

SUMMING UP

So as you can see, your options are varied and it all depends what you want to do with your computer. It may be that you have seen something in this article that you didn't even know you wanted until you read it. Well, you can either check out the suppliers list and follow it up yourself. Or you can check out the next issue for further details on the techno aspects of home computing. See you there.

poor quality), but expect to pay over £600. If the resolution of the ink jet printer is insufficient (120-180 dots per inch), you are into specialty printers such as thermal transfer printers costing several thousand pounds (300 dpi).

If you're into desktop publishing, forget dot matrix printers altogether. This is laser printer territory (prices in the region of £1200-1800), with the possible exception of an ink jet printer (HP Desk Jet £500+) and if you are very serious about your hobby, you should be looking for a postscript compatible laser printer for perfect typography (not under £3000).

Two more things to watch out for. If you're printing forms, make sure you buy a wide carriage printer (136+ columns), as you'll find 80 column printers very restrictive. The other point is that the initial saving on the best priced printer purchase may be obliterated by the regular purchase of very expensive ink ribbon cartridges. Check out the consumable prices, as they can vary enormously and will offset your original saving in no time at all...



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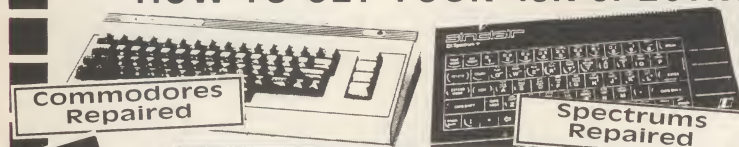
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EDUCATING RITA

Education is often foremost in parents' minds when they are thinking of buying their children a computer. But what is available for your child, and will it suit the age group? Franco Frey delves into the computer school library...

As a modern child your first intimate experience with computers and educational software is sitting wide-eyed in a technology-conscious kindergarten or primary school about to take your first computer steps with *Mr. Men*. Later on you'll proceed to more serious programs which complement or form part of your school curriculum, whether it be on the subject of English or foreign languages, mathematics, history, geography, geology, chemistry, biology, physics, mechanics, electronics, typing or introspectively computer studies. Chances are that parallel to this computer experience, you'll have a fling with computer games at home, where you will enjoy the more frivolous nature of computing.

The fact is that the computer is an ideal audio-visual tool capable of intelligent two-way communication: human input/feedback via keyboard, mouse, joystick, graphic pad or, in the near future, speech recognition; and computer output via screen activity, music/speech/sound effects, or hardcopy output in the form of text and graphics. Its brain today is certainly superior to the human one in respect of speed and memory when it comes to repetitive tasking, but lacking in creative logic, cross-referencing and natural value judgements (as yet...). Due to these abilities, computers were early on recognised as having a great potential in becoming excellent educational tools, provided the right software





could be written. Although in existence since the early eighties, it is only now that educational software is shaping up to the presentation and tutorial standards expected by the school authorities and, of course parents. Unsurprisingly, the largest bulk of programs has been written for the official school machines, the **Acorn BBC B/Master** and the more recent **Nimbus** (as the school representative of the MS-DOS machines), as the largest market was and still is the school software. But recent sales figures indicate a healthy home market, and more and more educational software companies are trying their hand at **Commodore, Amstrad, Spectrum, Amiga** and **Atari ST** versions, having witnessed educational programs such as *Database's Fun School 2* and *Mini Office II* creep up the software charts. Although the educational software spans the complete age range from three right up to adult, the home market tends to limit itself to the upper age of 11, as most parents will pass on responsibility of purchase to the educational institutions and expect any further use of the computer to be in the care of child and school. Purchasing educational software for home use may prove a challenge to parents these days, as after an enthusiastic acceptance by computer retailers in the early days, educational software has been a painful experience and has left a sour taste behind. A lot of coaxing will be required to ensure retailers regain confidence in this more matured market. Publications such as **The Educational Software Selection** or **Educational Software Directory** from Rickitt Educational Media provide the dealers with a catalogue which parents may peruse. The dealer can obtain the required product to order, and does not need to stock vast amounts of software in his shop. There are currently over 1000 programs for the popular computer systems on disk and tape! Getting to know the computer retailer with a soft spot for educational products is the first problem. Failing all else, distributors such as **Rickitt Educational Media** will accept telephone orders and provide technical backup for all the products they sell. Whether educational software is ever likely to grow into a significant aid for primary or further education remains to be seen, but the growing number of computers in use at schools throughout the country would indicate that the educational authorities are giving it a good try.

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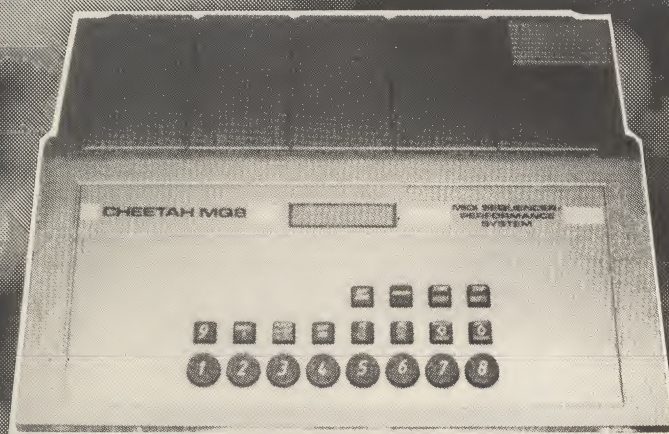
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THE SEARCH FOR SPOCK

Sure, you've probably scoured all the computer magazines and all of CCEG and have taken in as much info your head could possibly cope with, and you've still got hundreds of questions before you're absolutely sure which particular product to purchase. So what to do?

First, if you've got any computer freaks as friends, pick up as much advice from them. No doubt you'll be told what wonderful machine their particular computer is, but filter out the party political broadcast material and you'll still find lots of useful background info. Having made up your mind on the kind of product you'll spend your dosh on, you'll be faced with the decision where to buy it from.

There's loads of options. Specialist computer retailers (— your local computer shop), the major retail chain in the high street or the mail order discount house. Look at pricing, and you might find the answer easy, but hang on: is it as simple as that? What else other than competitive pricing should you be looking for?

How about friendly advice and good after sales service. Suppose your computer or peripheral won't work or your software won't load, what then. Of course there's a guarantee on the product, but if you're going to have to send it back by mail and wait several weeks for a working unit to arrive back, you might think a mail order company isn't such a good bet after all. You may be lucky and be dealing with an absolute dream of a mail order company (and, to be fair, there are lots of excellent companies in the market place) or you may be unlucky...who knows?

If you go for the high street chain, no problem, they'll replace your unit without batting an eyelid. Don't expect to get any useful advice though. In most cases you'll find sales staff who don't know a computer from a toaster and are simply selling a 'black box' to you. Beware of any pat answers regarding compatibility and any wild claims of what your black box can or can't do (mostly can): Forgive them, for they know not what they say

If this sounds like a generalisation, it is, and there are probably hundreds of cases to prove the aforementioned statement completely and utterly wrong. In the end it will depend entirely on the

manager handling the computer section of the shop. If the guy is switched on (in computer terms that is...), and available, you'll get a service as good as anywhere else or better. Ah, the power of statistics. Many will suggest the likelihood of meeting this kind of person in a major retail outlet to be extremely thin, but let's leave the statistics to the politicians...

If you're not a gambler you'll play safe and go to your nearest independent computer shop. Not only will you be able to return faulty goods without much fuss, but you'll normally get sound advice from a manager whose life depends on knowing what's what in the computer market. Chances of meeting a computer enthusiast are high (what silly berk would expect to make money from this trade?) and what's more, if you're good at chatting people up, you'll get a full demonstration as well. The independent may not always be able to give you the cheapest deal, but the little extra may be well worth it in the long run. The only thing the specialist does not like, is to spend most of his time advising you on the product only to see you go off and order it from the cheapest mail order house. That is definitely considered bad form and anyone with such a mean streak deserves everything he or she gets (or in this case maybe doesn't get) from the mail order house. There are probably 200 to 300 specialist shops in this country and they need your support, so that they can support your habit (computing that is). The majority belong to the National Association Of Specialist Computer Retailers (phew! I suppose NASCR for short) which provides the independent with a bit more muscle towards the producers but also tries to establish code of ethics and improve standardisation and warranty service on products. All dealers listed on these pages belong to this organisation. So if you're ready for a purchase, look up your nearest dealer and check him out!

NORTH

City Software

66 Lime Street, Liverpool,
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Computing World

Swaby's Yard, Walkergate, Beverley,
North Humber HU17 9BZ

Dixon Computer Centre

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LS1

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Micro City

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WALES

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Taunton Micro Centre

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Somerset TA1 3TP

The Computer Shop

4 Holland Walk, Barnstaple, N. Devon
EX31 1DW

The Games Cupboard

5 New Bridge Street, Exeter, Devon
EX4 3JW

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8 Fairfax Street, Bristol, Avon

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11 Old Town Street, Plymouth, Devon

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Essex SS8 9SL

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East Sussex TN40 1HT

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OX14 5NB

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NN13 5DW

Dataline Computing Services

14 Duke Street, Wisbech, Cambs.
PE13 2AS

Erol Computers Ltd.

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E17 7DB

Gallery Software

140 The Arndale Centre, Wandsworth,
London SW18

Gateway Business Systems

6 Station Road, New Milton, Hampshire
BH25 6JU

Nimbus Computing

6 Station Road, West Wickham, Kent
BR4 0PY

Pilot Software Ltd.

32 Rathbone Place, London W1P 1AD

Software Plus

8 Buckwins Square, Basildon, Essex
SS13 1BJ

The Model Shop

89E Woodbridge Road, Guildford,
Surrey

Capri Marketing Ltd.

9 Dean Street, Marlow, Bucks. SL7
3AA

Innovations

9 Harmondsworth Road, West Drayton,
Middx. UB7 9JJ

BOOK

CCEG

V1.2
73

Just great. There you are sitting in front of your brand new computer, feeling all chuffed with yourself, and with a little bit of luck you've even got it up and running. By the time you've read the measly manual you'll have appreciated that apart from warnings 'Don't do this' and 'Don't do that' the manufacturers seem to think the less you know about your computer the less harm you can do.

But what if you are interested? What if you would simply like to know all the Amiga DOS commands? Not in the manual, eh? Chuck in 20 games for free in the hardware package, but don't give away vital info on how to run your computer. Thanks!

Obviously there are plenty of books on every computer subject you can think of and your local computer bookshop will either have it in stock or will be able to order it for you, no problem, sure, we accept VISA/ACCESS. You'll find books covering hardware and systems software, programming languages and even application software. Mind you, a complete set of Amiga reference manuals will set you back over £100!

Calculate that in the computer purchase price and see whether you still think you had a good bargain or not. If you don't have a local stockist, use the excellent mail order services some of the specialist shops operate. Computer Manuals Ltd in Birmingham can supply from a massive range of 1500 titles and 50 publishers and pro-

vide a 24 hour service. If you can't find what you are looking for there, you'll have to write the book yourself! But then a lot of computer users will never need to use books as references. Who cares about Amiga DOS when all you do is boot up a new game's hit every week? But what about those unfair advantages, the games cheats, tips and pokes. And what game is really worth buying? No problem, your local newsagent has got shelves overflowing with monthly and weekly computer mags. Serious mags, not so serious mags and fluffy lollipop mags. And Oih! What's this! Cassette and disk covermounts with full games and demos and tips and pokes. All for less than three pounds...But hang on, new problem. Which one's the right mag for you? Forty odd titles there, you must be able to find one that suits your computer and application. Perhaps there's a book at the computer bookshop to tell me which magazine is just right for you...

Seriously, computer mags can be broken down into a number of categories and the listing included is not necessarily complete, but should give a fair representation of the current computer publications. There's nothing like browsing through the likely candidates at the newsagent (as long as you don't do all your reading there!)...

Book supplier:

Computer Manuals Ltd.
30 Lincoln Road, Olton
Birmingham B27 6PA
Tel.No. 021 706 6000



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Sinclair User	EMAP	£1.60
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Commodore Disk User	Argus Specialist Publications	£2.75
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ZZap!	Newsfield Publications	£1.50

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ATARI 8-BIT MAG

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Sinclair QL World	Focus Magazines	£1.75
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DRAGON MAG

Dragon User	Scot Press (yr sub)	£14.00
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Commodore User	EMAP	£1.10
Your Amiga	Argus Specialist Publications	£1.50

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ST Format	Future Publications	£2.95

PC

Byte	McGraw-Hill	\$5.00
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PC Plus	Future Publishing	£1.95

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What's the most essential entertainment device?

IT'S A POWERPLAY

No less than 100 PowerPlay joysticks must

If you're going to play — play tough! And for that you'll need the toughest joysticks to get you through endless hordes of mutant alien scum. That's why we're giving away 100 PowerPlay joysticks, they're the best companions on any joy ride!

PowerPlay manufacture ten styles of sticks, and we have ten of each style which **MUST** be won! The range kicks off with their original design, the Cruiser Blue, or if you fancy a smarter looking stick there's the Black Cruiser. And if you're a real trendsetter check out PowerPlay's latest colour scheme for the Cruiser range: a garish collection of pink, yellow and green (very popular abroad 'apparently'!).

The more advanced stick designs come in the Crystal range. Three Crystal Clears are available — the standard, the instant autofire, and the switchable autofire. All three are crystal clear so you can see right through the casing into the heart of the stick. (A surgeon comments: Urgh!)

The final four are a variation on the Crystal: a solid red stick, and a solid green stick. Both coloured sticks come in either standard or autofire form. They feature the latest in PowerPlay technology and are absolute whizzers in helping you achieve that high-score!

With 100 joysticks up for grabs, we're going to need 100 winners — and to get into the lucky lot try a tackle at this wordsquare. The 12 words to find are listed down the side. When you've found one, ring it clearly, and when you've located all 12 fill in the coupon and bung it off to:

STICK IT UP WITH POWERPLAY
COMPO, C.C.E.G., PO Box 10,
Ludlow, Shropshire SY8 1DB.



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Y JOYSTICK!!

st b won!!

RULES:

- ☞ You'll be a stickler for punishment if you're entry arrives after January 31 — that's the closing date!
- ☞ You'll get no joy from hassling with the Editor's decision — that sticks!
- ☞ We'll make it crystal clear that you can't enter if you're even slightly related to anyone who works for PowerPlay or the C.C.E.G.

WORDS TO FIND:

POWERPLAY JOYSTICK CRUISER CRYSTAL RED
GREEN AUTOFIRE STANDARD CLEAR BLACK

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C	R	S	T	J	Y	S	T	I	G	R	E	G

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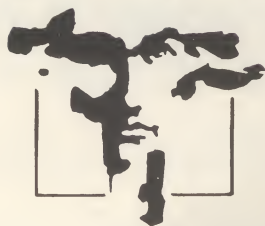
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520ST-FM SUPER PACK



The Atari Super Pack is ideal for you if you want to get off to a flying start with the best in entertainment software. The Pack includes a 520ST-FM with 1Mb RAM, a built-in 1Mb disk drive, over £450 of top games and a joystick. If you buy the Super Pack at Silica Shop, we will add our own ST Starter Kit (worth over £200), Free Of Charge. Return the coupon for details.

£399

INCLUDING VAT

With SM124 mono monitor: £498 INC VAT

With SC1224 colour monitor: £698 INC VAT

1Mb DISK DRIVE £450 OF SOFTWARE ARCADE GAMES

Arkanoid II	Imagine	£19.95
Beyond The Ice Palace	Elite	£19.95
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JOYSTICK

Atari CX40 Joystick	Atari Corp	£4.99
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FREE ATARI BUNDLE VALUE: £458.97

ATARI ST

ST COMPUTERS

The range of Atari ST computers offers something for everyone. From the games enthusiast who wants the challenge of the very best in arcade action, to the businessman who wants to make financial forecasts or faultless presentations. The ST offers high quality graphics, sound and speed for the gamer, whilst providing a fast, user friendly and affordable solution to business. The ST is now firmly established in the home environment and boasts a wealth of users in education, local government, television, and a variety of different businesses. Software for the range stretches to cover applications as diverse as ENTERTAINMENT, ACCOUNTS, ART, COMMUNICATIONS, COMPUTER AIDED DESIGN, DATABASES, DESKTOP PUBLISHING, EDUCATION, MUSIC, PROGRAMMING, SPREADSHEETS, WORD PROCESSING and more. For a full list of the software available, as well as details of the ST range, complete and return the coupon below.

All prices correct at the time of going to press. £40E

520ST-FM EXPLORER PACK WITH BUILT-IN 1Mb DISK DRIVE



The value for money offered by the Atari ST range is reflected in the Explorer Pack featuring the 520ST-FM computer with 512K RAM. The 520ST-FM computer now comes with a built-in 1 Mb double sided disk drive as well as a free mouse controller and a built-in TV modulator. The new 520ST-FM Explorer Pack includes the 520ST-FM computer, the arcade game Ranarama, a tutorial program and some useful desktop accessories. In addition, if you buy the Explorer Pack from Silica, we will give you the Silica ST Starter Kit worth over £200, FREE OF CHARGE. Return the coupon for details of our Starter Kit and of the full ST range.

£260

ONLY £2.51 PER WEEK
RETURN COUPON FOR DETAILS
+ VAT = £299

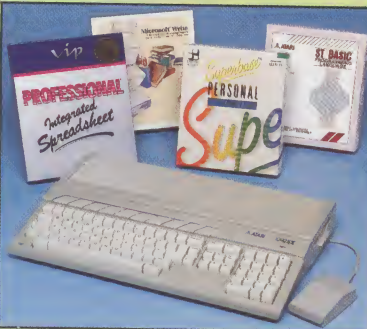
+ SM124 mono monitor: £398 INC VAT

+ SC1224 colour monitor: £598 INC VAT

1040ST-FM PROFESSIONAL PACK

NOW WITH TV MODULATOR

For the serious home user and the small business, we are pleased to announce a new package based around the 1040ST-FM. The 1040ST-FM has 1Mbyte RAM and a 1Mbyte built-in disk drive. In addition, the 1040ST-FM now comes with a TV modulator built-in. (The previously available 1040ST-F was designed for use with a monitor only and did not come with a modulator.) This modulator allows the 1040ST-F to be plugged directly into any domestic TV set, and comes complete with a lead to allow you to do so. The new 'Professional Pack' from Silica includes the new 1040ST-FM with modulator plus four high quality software packages including a spreadsheet, database, word processor and programming language. This 'Professional Pack' software will enable you to get straight down to business with your new computer. In addition to this software (worth £384.84), if you buy the Professional Pack from Silica Shop, you will also receive the Silica ST Starter Kit (worth over £200), Free Of Charge. Return the coupon for further information.



£499

INCLUDING VAT

With SM124 mono monitor: £598 INC VAT

With SC1224 colour monitor: £798 INC VAT

ATARI 1040ST-FM	(Computer)	£499.99
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NORMAL RRP: £884.82

LESS DISCOUNT: -£385.82

PROFESSIONAL PACK PRICE: £499.00

2Mb & 4Mb MEGA ST

The MEGA ST computers are styled as is lightweight keyboard with a separate CPU, connected by a coiled telephone style cable. There are two versions of the MEGA ST, one with 2Mbytes of RAM and the other with 4Mbytes. Each version has a 1Mbyte double sided disk drive built-in to the CPU unit. The MEGA ST's do not come with modulator built-in and must therefore be used with a monitor. With every MEGA ST purchased, we will add the 'Professional Pack' software (worth £384.83) detailed above, plus the Silica ST Starter Kit (worth over £200) both Free Of Charge. Return the coupon for further details.

2Mb MEGA ST

£899 INC VAT

+ mono monitor = £998

+ colour monitor = £1198

4Mb MEGA ST

£1199 INC VAT

+ mono monitor = £1298

+ colour monitor = £1498



DTP PageStream £149 +VAT = £171.35

Desktop Publishing (DTP) is one of the fastest growing applications for personal computers. We are pleased to announce a powerful low cost package for the Atari ST called PageStream. PageStream costs only £149 (+VAT=£171.35) and, because it works with an Atari 1040ST and a Seikosha SP-180AI printer, you can be up and running with a complete system for less than £1000. Some of the features of PageStream are listed to the right. If you would like further information on this program, complete and return the coupon below, ticking the 'DTP' box in the corner.

- TEXT-FLOW AROUND GRAPHICS
- ROTATION OF TEXT & GRAPHICS
- SLANT OR TWIST ANY OBJECT
- POSTSCRIPT COMPATIBLE
- TAG FUNCTION
- AUTO/MANUAL KERNING & HYPHENATION
- GROUPING OF OBJECTS

DO YOU OWN AN ATARI ST?

If you already own an Atari ST computer and would like to be registered on our mailing list as an ST user, let us know. We will be pleased to send you copies of our price lists and newsletters FREE OF CHARGE as they become available. Complete the coupon and return it to our Sidcup branch and begin experiencing a specialist ST service that is second to none.

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LONDON 01-629 1234 ext. 3914

Selfridges (1st floor), Oxford Street, London, W1A 1AB

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To: Silica Shop Ltd, CCEG1289, 1-4 The Mews, Hatherley Road, Sidcup, Kent, DA14 4DX
PLEASE SEND FREE LITERATURE ON THE ATARI ST

Mr/Mrs/Ms: Initials: Surname:

Address:

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Do you already own a computer
If so, which one do you own?

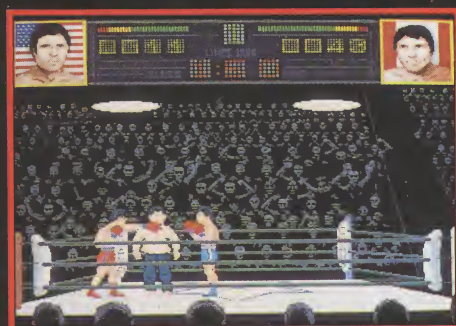
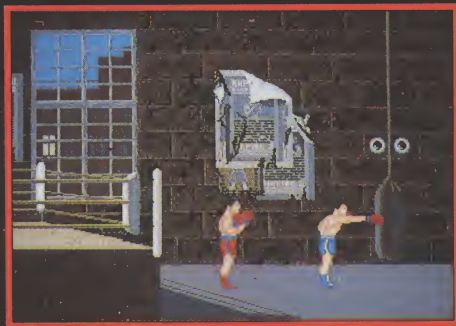
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FREE SILICA STARTER KIT WORTH OVER £200

WITH EVERY ST - RETURN COUPON FOR DETAILS
ALL PRICES QUOTED INCLUDE FREE UK DELIVERY

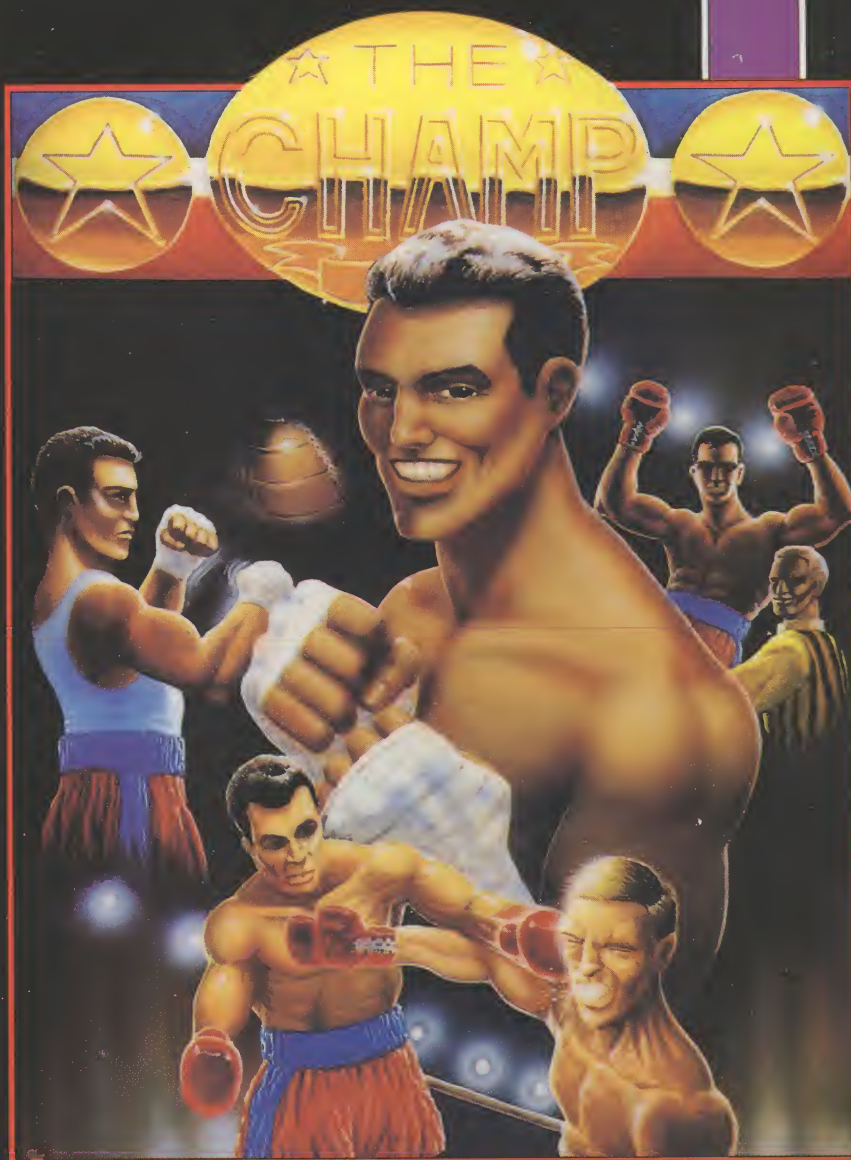
Before you decide when to buy your new Atari ST computer, we suggest you consider very carefully WHERE you buy it. There are MANY companies who can offer you a computer, a few peripherals and the top ten selling titles. There are FEWER companies who can offer a wide range of products for your computer and expert advice and help when you need it. There is ONLY ONE company who can provide the largest range of Atari ST related products in the UK, a full time Atari ST specialist technical helpline and in-depth after sales support, including free newsletters and brochures delivered to your door for as long as you require after you purchase your computer. That one company is Silica Shop. We have been established in the home computer field for ten years with an annual turnover in excess of £8 million and can now claim to meet our customers requirements with an accuracy and understanding which is second to none. But don't just take our word for it. Complete and return the coupon below for our latest literature and begin to experience the Silica Shop specialist Atari service.

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SKATE OF THE ART

The crazy game for all Skateboard fans
Out on the **Amiga** from mid July.
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THE CHAMP

Endorsed by the **WORLD BOXING COUNCIL**, **THE CHAMP** is simply the most realistic boxing simulation ever written for the computer:

- With the original '**ROCKY**' theme tune —
 - More than 1300 Frames of animation —
 - One or two player mode —
 - A booklet with the history and rules of boxing —
 - Keyring with mini boxing gloves —
- and a lot more. No surprise that everyone is enthusiastic about it: **TILT HIT** in France, **SMASH GOLDMEDAL** in Germany... a great simulation.

Now available for **AMIGA** soon out on **ATARI ST**, **C64**, **AMSTRAD** and **SPECTRUM**
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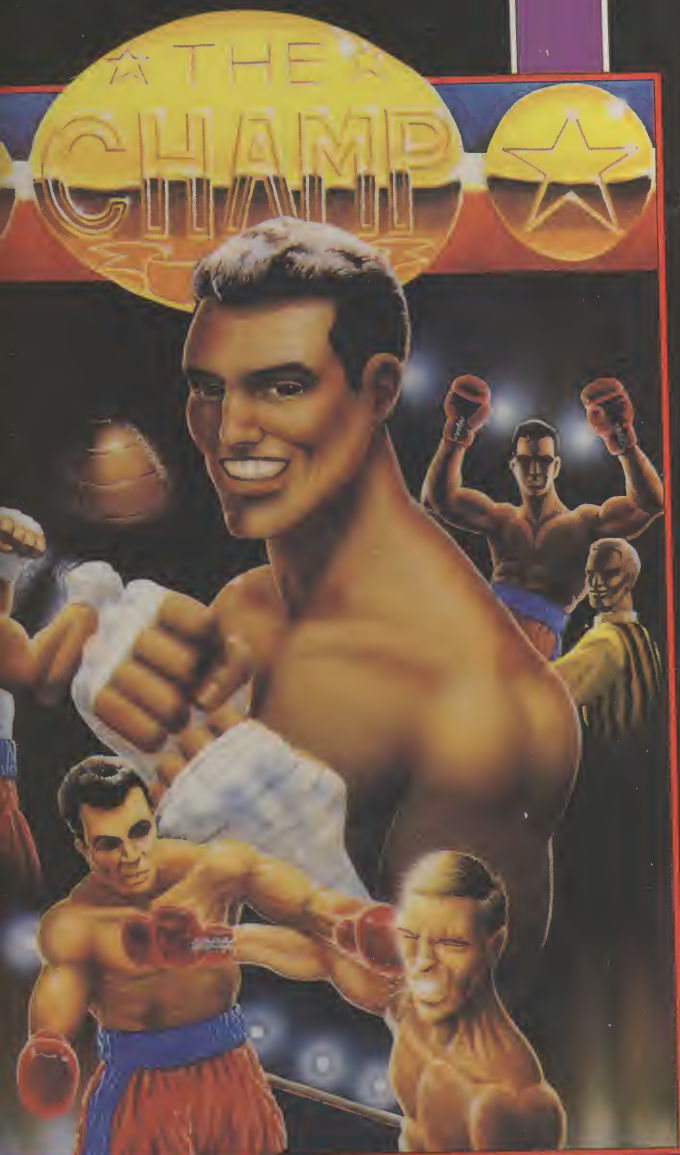
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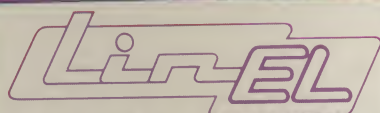
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